Content and Construct Validity of the Health of the Nation Scale for Children and Adolescents (HoNOSCA)

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Abstract

Research investigating the content and construct validity of the Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA) is limited. The present investigation firstly explored the content validity of the HoNOSCA in two studies. The first study compared and contrasted the HoNOSCA against major developmental psychopathology theory and found that the scale contained some items reflecting family systems and developmental psychopathology theory but did not include items reflecting biological, cognitive and attachment theory. This absence challenges the content validity of the HoNOSCA. Part B of Study 1 explored the face validity of the HoNOSCA through a focus group discussion with Child and Youth Mental Health Service clinicians. The HoNOSCA was perceived by staff to reflect key features of diagnoses for the children and adolescents that they work with. The construct validity of the HoNOSCA was explored in Study 2. In Part A, responses from 245 participants were analysed. The Principle Components Analyses found the predicted four-factor structure of the HoNOSCA could not be confirmed. Discriminant Function Analysis found the HoNOSCA could significantly discriminate between internalization and externalization disorders in children and adolescents. Profiles of mean scores illustrated different item elevation profiles for internalization (mood and anxiety disorders) and externalization (behavioural) disorders. Some initial normative data were collected in order to illustrate how useful standardized norms could be to practicing clinicians. In Part B of the study, 83 participants with the diagnosis of anxiety disorder were extracted from the sample. Further Discriminant Function Analyses revealed that the HoNOSCA could not discriminate between sub-types of anxiety disorders as diagnosed by the team. The content and construct validity of the HoNOSCA was then discussed and scale modifications were suggested that may improve the validity of the scale.

Certification

This report contains no material offered for the award of any other degree or diploma, or material previously published, except where due reference is made in the text.

Karen M. de Nooyer

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CHAPTER 1

Demonstrating the effectiveness of Australian mental health services was a priority identified by the Commonwealth Government in its National Mental Health Plan implemented in 2003. The National Mental Health Plan Australia for 2003-2008 endeavoured to enhance services provided through Mental Health Services including Child and Youth Mental Health Services. Since the launch of the National Mental Health Plan, clinicians have been provided with a suite of Outcome Information System (OIS) scales and state-wide training opportunities to implement the outcome measures.

The routine outcome measures were designed to assist with assessment and treatment each time a child or young person entered the mental health system. From assessment onwards through to discharge, data were collected by clinicians to serve two main purposes. Firstly, the data were intended to guide treatment decision making through the tracking of clinical indicators and outcomes of intervention, and secondly, to serve as a case mix model to guide funding and resource allocation across regions (Whiteford, Buckingham & Manderscheid, 2002). The OIS system was seen as a new and improved process for routine outcome measurement as it provided a set of consistent measures nationwide that were nonexistent prior to the National Mental Health Plan. The suite of scales for the child and youth mental health services included the Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA) and other measures including the Strengths and Difficulties Questionnaire (SDQ), the Factors Influencing Health Scale (FIHS) and the Children's Global Assessment of Functioning (CGAF).

This research project was developed within the Queensland Child and Youth Mental Health system, and one of the minimum data set of Outcomes Information System scales used by clinicians, the HoNOSCA, was selected as the focus of this research project. The HoNOSCA was adapted from the Health of the Nation Outcome Scale (HoNOS), the original

adult version of the scale. Both of these scales and the Health of the Nation Scale for older persons (HoNOS+65) were developed through a series of versions by the Royal College of Psychiatry in the United Kingdom in the 1990s and have subsequently been subjected to various field trials and evaluation prior to implementation in Australia.

The HoNOSCA was intended for use in child and youth mental health services to measure the mental health, social and behavioural functioning associated with psychopathology between points of assessment, review and discharge within a service episode. Similar to the HoNOS, the HoNOSCA was designed to be brief enough for routine use across the country while also covering the clinical and social range required and remaining sensitive to change (Wing, Beevor, Curtis, Park, Hadden & Burns, 1998). The HoNOSCA was described by the National Mental Health Strategy as a 'gold standard' outcome measure and was considered to be developmentally sensitive to the unique population of children and adolescents. Given this reputation, it is sometimes assumed to have sound theoretical and empirical validity.

However, a paucity of current research exists regarding the content or theoretical validity of the HoNOSCA. In addition, concerns have been raised in the literature regarding the construct validity of the HoNOSCA. Furthermore, the HoNOSCA has not yet been used to explore any specific diagnostic group. This research project was therefore created with the goal of extending the current literature regarding the content and construct validity of the HoNOSCA.

The first aim of this research is to investigate the content validity of the HoNOSCA. After comparing the HoNOSCA and HoNOS items, the content validity will be explored through two studies. Firstly, the content validity of the HoNOSCA will be appraised through comparing and contrasting items against major developmental theory to determine whether the HoNOSCA does indeed reflect theoretical content of developmental issues. Secondly, the

content validity will be explored through a pilot face validity study with informed clinicians to determine whether they perceived the HoNOSCA to measure problems affecting the mental health of child and adolescent consumers. These processes are intended to investigate the content validity of the HoNOSCA and to provide a platform from which to investigate construct validity.

The second aim of this research is to investigate the construct validity of the HoNOSCA. This will be conducted through two studies. Firstly, the internal structure of the HoNOSCA will be analysed across a range of disorders seen by a mental health service. Secondly, the internal structure of the HoNOSCA will then be analysed within one specific group of disorders, anxiety disorders. The investigations into both the content and construct validity of the HoNOSCA may yield useful insights, and provide suggestions for improving the validity of the HoNOSCA and directions for future research.

To contextualize this research project, epidemiological data are outlined describing the extent to which psychopathology affects the child and adolescent population. As this research was conducted within the context of the Queensland Child and Youth Mental Health Service system, this system and routine outcome measures are then outlined, setting the scene for the studies that investigate the content and construct validity of the HoNOSCA.

Epidemiology of Mental Illness in the Child and Adolescent Population

Prevalence data from the last 50 years points to an increase in psychosocial disorders affecting young people (Sawyer, Arney & Baghurst, 2001). Studies testing this assumption have examined time trends in reported prevalence rates of disorder, official record data for suicide and crime, and lifetime rates of disorder reported retrospectively by individuals in different birth cohorts (Sawyer et al. 2001). The majority of these sources point to rising rates of child conduct problems, depression and suicide in nearly all developed countries since the Second World War and the most pivotal of these studies are now critically reviewed.

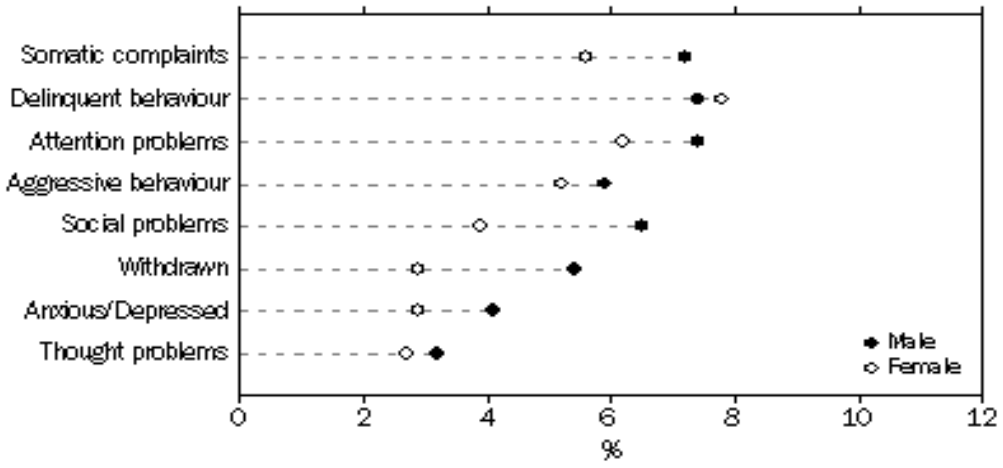
The research conducted by Collishaw, Maughan, Goodman and Pickles (2004) in the United States found a substantial increase in adolescent conduct problems in males and females over the 25-year study period. For example, findings included a significant increase in mean scores between the cohorts born in 1958 and 1970 and the cohorts born in 1970 and 1984. In addition, the proportion scoring above a predetermined cut-off point identifying severe conduct problems rose from 6.8% to 10.4% to 14.9% across the three cohorts, so that by 1999 (when the latest-born cohort was 15-16 years old), more than twice as many children fell into the 'severe range' as in 1974 which the earliest-born cohort was assessed at the same age (Collishaw et al. 2004). Trends were the same for boys and girls. These authors concluded that there has been a significant increase in the proportion of young people with conduct problems and perhaps of conduct disorder. However, Costello, Egger and Angold, (2005) were cautious about claims of increased conduct problems stating that conclusions are difficult to draw because of subtle changes in diagnostic classification. For example, changes from the DSM-III and DSM-II-R resulted in a dramatic 'masculinization' of the criteria and a shift in the sex ratio.

A recent epidemiological study of the prevalence of psychopathology among Canadian youth indicated that approximately 18% of four to sixteen-year-old children and adolescents manifest a psychiatric illness (Gabbard, Beck & Holmes, 2005). Although prevalence rates varied for specific disorders, these findings were consistent with other studies in suggesting that, at any given time, a substantial percentage of youth manifest a significant psychiatric difficulty. Gabbard et al. (2005) found that 20% of children and adolescents in the United States of America manifest a clinically significant behavioural, emotional or developmental difficulty at any given time. Moreover, a substantially larger percentage of youth manifest social, academic, behavioural or emotional symptoms that, although not of

sufficient duration or severity to warrant a DSM-IV diagnosis, adversely affect their adjustment and development.

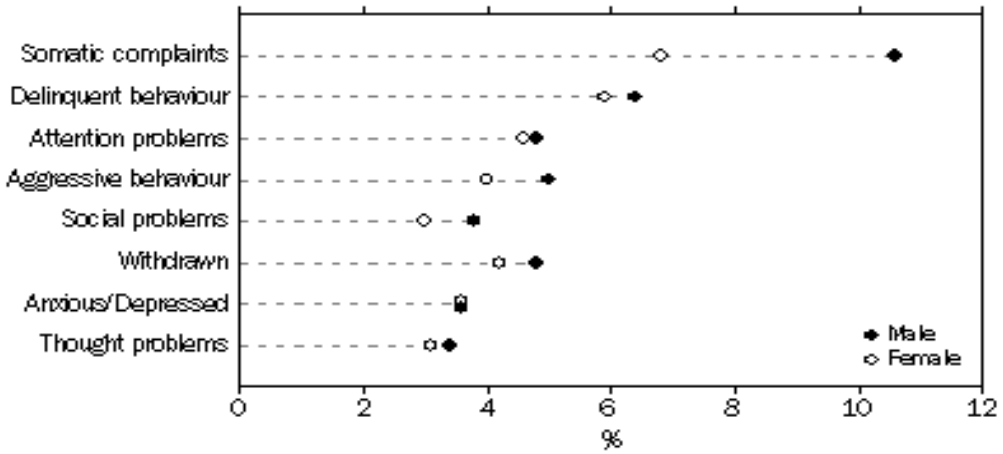
Epidemiological data suggested comparable prevalence of mental health problems in Australian children and adolescents. The Child and Adolescent Component of the National Survey of Mental Health and Wellbeing was conducted in Australia in 1998, studying 4,500 children and young people from metropolitan and rural areas across Australia (Sawyer et al. 2001). The prevalence of mental health problems was based on scores obtained from the Child Behaviour Checklist (CBCL) (Archenbach, 1991a) completed by parents, teachers and young people. The results showed that 14% of children and young people (aged 4-17 years) had mental and emotional 'internalising disorders' or behavioural 'externalising disorders' as depicted in Figures 1.1 and 1.2. Somatic complaints (chronic physical complaints without known cause or a medically verified basis) and delinquent behaviour were the most common specific problems reported by parents. Around 7% of children and adolescents scored in the clinical range on both these scales. Attention problems (6%) and aggressive behaviour (5%) were also identified.

Fifteen percent of children and adolescents met symptom criteria for one of the three mental disorders assessed in the survey. Males were more likely to have one of these disorders than were females (19% versus 10%). This is not surprising, given that two of the three conditions studied (Conduct Disorder and Attention-Deficit/Hyperactivity Disorder) are known to be more common among males.



Source: Sawyer et al 2000

Figure 1.1 *Mental health problems in Australian children aged 4-12 years (1998)*



Source: Sawyer et al 2000

Figure 1.2 *Mental health problems in Australian children aged 13-17 years - 1998*

Children aged 6 to 12 years were more likely to have a disorder than were adolescents aged 13 to 17 years (17% versus 12%). This finding was primarily due to the large number of children who met symptom criteria for Attention-Deficit/Hyperactivity Disorder. However, it is necessary to be cautious when interpreting the meaning of this high prevalence, as two of the formal criteria identified in the DSM-IV could not be incorporated into the assessment of children in this study. Inclusion of these criteria may have reduced the prevalence rates.

The Child and Youth Mental Health Service

A description of the Queensland Child and Youth Mental Health Services provides some context to this research project. The Child and Youth Mental Health Services (CYMHS) are a component of Queensland Health's Mental Health Program, providing early diagnosis and intervention, treatment and rehabilitation for the target group of children and young people between the ages of twelve months of age to eighteen years of age. A typical CYMHS is a multidisciplinary team usually consisting of staff such as psychologists, psychiatrists, social workers, occupational therapists, speech and language pathologists and nurses. As specialist services, CYMHS target direct service delivery to that portion of the child and youth population with severe and complex disorders, or at high risk of becoming so, and whose needs cannot be met by other services (Queensland Mental Health Policy Statement, 1996). Examples of high risk groups include children and youth living with family members who have mental illness, those in care of the State or in contact with the law, those with early onset of mental disorders such as psychosis, those suffering abuse, neglect or other traumas, children and youth with chronic illness or disability or youth engaging in substance abuse.

Access to the CYMHS is determined by a clinical decision, taking into account the psychiatric nature of the disorder, the severity of disturbance, the complexity of the condition including co-morbidity, the extent of functional impairment and the level of child, young person's and/or family distress. Depending on the size of the service, CYMHS teams offer either community or outpatient services or both.

Mental Health Services and Routine Outcome Measurement

All public mental health services across Australia have implemented routine outcome measures as a result of the National Mental Health Policy developed in 1992 after routine outcome measurement in mental health services were introduced by the National Institute of Mental Health in the United States and in the United Kingdom. One of the key objectives of

the Australian policy was to institute regular reviews of outcomes of services provided to persons with serious mental health problems and mental disorders as a central component of mental health service delivery (Trauer, 2004). Prior to this time, there were no agreed upon definitions for a hierarchy of severe and complex mental health problems and prevented any ascertainment of the most disturbed or needy children according to Clark, Malley, Woodham, Barrett and Byford (2005). The outcome measures, according to the National Mental Health Outcomes and Casemix Collection (2003) were meant to be helpful in routine clinical practice to allow monitoring of the health and wellbeing of the individual consumer. The measures were intended to be suitable for monitoring outcomes at the broader service level regarding determinants of case mix concepts in mental health. The National Mental Health Plan (2003-2008) aimed to improve the quality of information available to guide decisions at all levels of the health system (Mental Health National Outcomes and Casemix Collection, 2003).

The First National Mental Health Plan (1993-1998) in Australia responded to the fact that standardized consumer outcomes prior to 1993 were simply not measured at all and aimed to identify consumer outcome measures that would serve two needs. Firstly, the outcome measures including the HoNOSCA had to be useful in routine clinical practice to allow monitoring of the health and wellbeing of the individual consumer. Second, the measures had to be useful in monitoring outcomes at the broader service level. The National Mental Health Plan (2003-2008) stated that at the clinical practice level, clinicians need access to information that informs treatment decisions, contributes to evaluation of the effectiveness of interventions and the monitoring of client progress. Furthermore, consumers need information to evaluate the treatments they receive (Mental Health National Outcomes and Casemix Collection, 2003).

In an attempt to promote an evidence-based approach to service delivery, the Queensland Department of Health introduced a data collection procedure in which a battery of assessment instruments were routinely administered at intake and discharge with all clients of child and youth mental health facilities throughout the state. The assessment package included the Health of the Nation Outcome Scale-Child and Adolescent (HoNOSCA), the Factors Influencing Health Status (FIHS) rating, the Strengths and Difficulties Questionnaire (SDQ) and the Children's Global Assessment of Functioning (C-GAF). The scale focused upon in this research was the HoNOSCA (Mental Health National Outcomes and Casemix Collection, 2003).

The Health of the Nation Outcome Scales

A description of the Health of the Nation Outcome Scales highlights the adaption of the adult scale into the child and adolescent version of the scale. The Health of the Nation Outcome Scales (HoNOS) arose out of the United Kingdom's Health of the Nation Strategy in 1996 to significantly improve the health and social functioning of mentally ill people. Initially the HoNOS was created by Wing et al. (1998) through the United Kingdom Royal College of Psychiatry Research Unit as an instrument that could be routinely used to measure and record problems in patients' mental health and social functioning in adults with mental illness. The purpose of the Health of the Nation Outcome Scales was to be a global representation of dysfunction, impairment and symptoms associated with the diagnosis of clinical mental disorder (Gowers, Bailey-Rogers, Shore & Levine, 2000).

The HoNOS contains 12 items each scored on a 5-point likert scale and these 12 items were combined within four subscales including behaviour, impairment, symptoms and social functioning. After versions of the scale were revised, the resultant HoNOS contained items that measured problems with overactive, aggressive, disruptive or agitated behaviour, non-accidental self-injury, problems with drugs or alcohol, cognitive problems, illness or

disability, problems with hallucinations and delusions, problems with depressed mood, other mental or behavioural problems, relationships, activities of daily living, problems with living conditions and problems with occupation and activities. HoNOS scores were designed to be collected at the points of assessment, review and discharge to monitor progress, measure improvements during a service episode and to guide therapeutic decision making (Bech, Bille, Waarst, Wiese, Borberg, Treufeldt and Kessing, 2006).

Some studies have built upon the purpose of the HoNOSCA and explored its responsiveness. For example, in a Danish study, Bech, Bille, Schutze, Sondergaard, Wiese and Waarst (2003) demonstrated that the HoNOS could be used as an outcome scale on the dimension of symptoms and social problems independent of the diagnostic classification of the patient under investigation and could measure improvement from the time of admission to the time of discharge. Furthermore, Bech et al.(2006) found that when the HoNOS was used as a diagnosis-anonymous severity measure of symptoms and social problems, it could rank order the main diagnostic ICD-10 categories of mental disorder. Based upon this scale, the scale for older persons (HoNOS +65) and scale for children and adolescents (HoNOSCA) were developed (McClelland, Trimble, Fix, Bell & Stevenson, 2000).

The Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA) was later developed by Gowers, Harrington, Whitton, Lelliott, Beevor, Wing and Jezzard (1999) as the child and adolescent version of the HoNOS (Health of the Nation Outcome Scale). With the same purpose as the HoNOS, the developers of the HoNOSCA made modifications to the adult version. Whist maintaining the claim that the HoNOSCA reflected a global measure of a patient's mental health, the developers claimed to take into account developmental issues, and placed a greater importance of family life and education to encompass a range of problems encountered in child and adolescent mental health services. The University of Manchester Department of Child and Adolescent Psychiatry, in

conjunction with the College Research Unit, undertook a program of development and assessment that included a consultation phase, a pilot trial over 50 sites, field trials in 36 sites and tests of reliability and validity both in the United Kingdom and in Australia. The early results suggested a satisfactory balance between simplicity and depth (Gowers, Bailey-Rogers, Shore & Levine, 2000). Since its inception, field trials have continued in Britain, Denmark and Australia. A copy of the HoNOSCA has been included in Appendix C.

The HoNOSCA was subsequently recommended as a routine child and adolescent mental health outcome measure for Australia and has been introduced into public Child and Adolescent Mental Health Services (CAMHS) or Child and Youth Mental Health Services (CYMHS) as they are known in various states (Lambert, Caputi & Deane, 2002). The HoNOSCA was designed to be an instrument brief enough to be found useful by busy clinicians to measure health and social functioning in clinical practice and also robust enough to provide when aggregated, an index of progress for local and national public health purposes (Wing, Lelliott & Beevor, 2000).

The HoNOSCA items require description in more detail as the items are focused upon heavily throughout this research project. The HoNOSCA contains two sections. Section A is a 13 item global assessment of psychosocial functioning in children and adolescents within four subscales. The Behavioural subscale includes Item 1 ‘Disruptive, antisocial or aggressive behaviour’, Item 2 ‘Problems with over-activity, attention or concentration’, Item 3 ‘Non-accidental self-injury’ and Item 4 ‘Alcohol, substance or solvent misuse’. The Impairment subscale includes Item 5 ‘Problems with scholastic or language skills’ and Item 6 ‘Physical illness or disability problems’. The Symptom subscale includes Item 7 ‘Problems associated with hallucinations, delusions or abnormal perceptions’, Item 8 ‘Problems with non-organic somatic symptoms’ and Item 9 ‘Problems with emotional and related symptoms’. The Social subscale includes Item 10 ‘Problems with peer relationships’, Item 11 ‘Problems

with self care and independence', Item 12 'Problems with family life and relationships' and Item 13 'Poor school attendance' (Clarke et al. 2005).

In both the HoNOS and HoNOSCA, Section B contains items measuring problems with knowledge or understanding about the nature of the difficulties and problems with lack of information about services or management of the child or adolescent's difficulties. Section B is not included in total score measurement. Each of the 15 questions requires a measurement of severity and each item is rated on a five-point item of severity from 0 to 4. A score of 0 indicates no problem, a score of 1 indicates minor problems requiring no formal action, a score of 2 indicates a mild problem, a score of 3 indicates problem of moderate severity, 4 severe to very severe problem and 9 indicating the information is not known or not applicable. Lower scores indicate better levels of functioning whilst higher scores indicate greater degrees of impairment. The rating period is generally the preceding two weeks, except at discharge from inpatient care, when it is the previous three days. The items of the HoNOSCA are now focused upon in a critique against the HoNOS and then against major developmental theory.

The HoNOSCA and the HoNOS

As a prelude to a critique of both the content and construct validity of the HoNOSCA in this research project, the HoNOSCA items are first compared with and contrasted against the adult HoNOS items from which the HoNOSCA was adapted. As previously discussed, the developers of the HoNOSCA aimed to take into account developmental issues, and place a greater importance of family life and education to encompass a range of problems encountered in child and adolescent mental health services depth (Gowers et al. 2000). This critique serves to develop the argument that the HoNOSCA could be improved and further developed in order to focus more upon the unique issues pertaining to children and adolescents.

The items in both the HoNOS and the HoNOSCA are compared and contrasted as shown in Table 1.0 for ease of interpretation showing the similarities and differences between the scales. The HoNOS and the HoNOSCA appear to contain many similarities. As shown in Table 1.0, five of the twelve items in both the HoNOS and HoNOSCA are virtually identical, namely: items measuring disruptive or aggressive behaviour, non-accidental self-injury, drug and alcohol abuse, physical illness, and hallucinations and delusions. In other items, only semantic differences are observed. For example, the HoNOS measures problems with 'relationships' and the slightly reworded HoNOSCA item measures problems with 'peer relationships'. In a similar vein, the HoNOS measures problems with occupation, and the HoNOSCA measures problems with school attendance. On one hand this difference may be considered to reflect age differences but, on the other hand, attending school may have been considered a child or adolescent's occupation. Furthermore, both the HoNOS and HoNOSCA measure problems with self care and independence although the wording is different between the two scales.

Table 1.0

Similarities Between HoNOS and HoNOSCA Items.

HoNOS	HoNOSCA
Overactive, aggressive, disruptive or agitated behaviour	Disruptive, antisocial or aggressive behaviour
	Problems with over-activity, attention or concentration
Non-accidental self-injury	Non-accidental self-injury
Problem drinking or drug-taking	Alcohol, substance or solvent misuse
Cognitive problems	
	Problems with scholastic or language skills
Physical illness or disability problems	Physical illness or disability problems
Problems with hallucinations and delusions	Problems with hallucinations and delusions
Problems with depressed mood	Problems with emotional and related symptoms
	Problems with non-organic somatic symptoms
Other mental and behavioural problems [Specify disorder]	
Problems with relationships	Problems with peer relationships
	Problems with family life and relationships
Problems with activities of daily living	Problems with self care and independence
Problems with living conditions	
Problems with occupation and activities	Poor school attendance

In contrast, some HoNOSCA items are considered to reflect developmental differences between adults and children as suggested by Gowers et al (2000). Firstly, the HoNOSCA includes Item 5 to measure problems with scholastic and language skills. This item includes problems with reading, spelling, arithmetic or speech and language associated with learning disorders, disabilities or emotional or behavioural problems which appeared particularly pertinent to the child and adolescent population. Secondly, the HoNOSCA includes Item 8 to measure problems with non-organic somatic problems. For example, this item includes typically child related problems such as non-organic enuresis and encopresis, non-organic aches and pains, tics and sleep problems. Thirdly, the HoNOSCA acknowledges the fact that children are usually cared for within the environment of a family unit and therefore an item is included to measure problems with family life and relationships. In contrast, the HoNOS reflects the independent nature of adults and measures problems with activities of daily living and problems with living conditions which highlighted some important developmental differences between the HoNOS and HoNOSCA.

Upon observation of the HoNOS and HoNOSCA items, the HoNOSCA appears to contain many items that were identical or very similar to the HoNOS. Some items do reflect developmental differences but one may argue that the HoNOSCA is not a specific child and adolescent scale and does not comprehensively reflect developmental differences between the problems experienced by the child and adolescent mental health population and problems encountered by the adult mental health population.

In summary, the HoNOSCA is found to be closely modeled upon the HoNOS as the creators suggested. In fact more than half the HoNOSCA items are identical to the HoNOS or contain only slight differences. Therefore, due to the similarities between the two scales, one may justifiably question whether the HoNOSCA may require some revision in order to develop it into a unique child and adolescent scale. Investigation into the content validity of

the scale was thus undertaken to determine the theoretical strengths and breadth of the HoNOSCA.

CHAPTER 2

Part A: Examining the Content Validity of the HoNOSCA

Study 1: Developmental Psychopathology Theory and the HoNOSCA

The current version of the HoNOSCA allows for the measurement of severity of causal problems (such as abuse and neglect) that may have contributed to the development of disorder and allows for the measurement of problems (such as behavioural difficulties and peer problems) that may have occurred as a result of disorder. A perusal of scoring instructions written both in the Outcome Information System Clinician's Handbook (2003) and in the scoring guidelines written by Gowers et al. (1998) appeared to suggest that severity of presenting problems (symptoms, behaviour, impairment), predisposing and perpetuating problems can all be included in rating particular HoNOSCA items as long as these problems are associated with the disorder diagnosed.

A scale measuring a global range of problems associated with psychopathology in children and adolescence needs to be developmentally relevant. Such a scale based on developmental theory could also be considered very valid in terms of content validity. Many theories make significant contributions to understanding the development of psychopathology and many of these are included within a developmental psychopathology framework. For example, in conceptualizing psychopathology, biological and behavioural genetic theory, family theory, attachment theory, cognitive and integrated theories offer valuable insights.

A literature search was conducted to explore the content validity and theoretical underpinnings of the HoNOSCA. A literature search through databases including EBSCOhost (Academic Search Premier, CINAHL, Psychology and Behavioural Sciences Collection and PsychINFO), Science Direct and Wiley InterScience using the terms 'content validity' and 'theoretical validity' and HoNOSCA resulted in a dearth of content validity

publications. Only one research article was found to investigate the content validity of the HoNOSCA. This research by Macgregor and Sheerin (2006) only concentrated on Item 12 and tested whether a relationship existed between HoNOSCA subscale 12 and the McMasters Clinical Rating Scale which was based upon a scale derived from the McMasters model of family functioning, known as the Family Assessment Device (FAD). The HoNOSCA was significantly correlated with the mean family scores on the FAD subscales including general functioning ($r = .553$, $p < .005$), roles ($r = .619$, $p < .01$) and communication ($r = .619$, $p < .01$). HoNOSCA was also significantly correlated with mother's scores for the following FAD subscales: communication ($r = .646$, $p < .001$); roles ($r = .620$, $p < .001$); affective responsiveness ($r = .564$, $p < .01$); affective involvement ($r = .456$, $p < .05$) and general functioning ($r = .617$, $p < .01$). In summary, this research found that HoNOSCA Item 12 corresponded well to the theoretical model of McMasters and suggested that HoNOSCA Item 12 was a good indicator of whether further, more comprehensive family assessment or family therapy was required. This study appears to be the only published research touching upon the theoretical validity of the HoNOSCA. No other published literature was found with these search terms suggesting that, as yet, very little research has been published to explore the content validity of the HoNOSCA. This situation provided the rationale for the current study to examine the content validity of the HoNOSCA against developmental psychopathology theory.

Aim and Hypothesis

The validity of a psychometric instrument indicates its ability to produce findings that are consistent with theoretical or conceptual values; in other words, to produce meaningful results and to measure what is supposed to be measured (Sarantakos, 1998). There are two ways of checking the validity of an instrument: theoretical and empirical validation. Therefore, the HoNOSCA items were compared and contrasted in a review against theories

of developmental psychopathology with the aim of exploring the theoretical content validity of the scale.

As suggested previously, the HoNOS and the HoNOSCA contain many item similarities suggesting that many developmentally relevant problems associated with child and adolescent psychopathology may be overlooked. Therefore the hypothesis proposed in this study is that contributions from developmental psychopathology theory could contribute significantly to the content validity and developmental sensitivity of the scale. This hypothesis was tested by critiquing the HoNOSCA items against major theories of disorder development.

Major Theories of Developmental Psychopathology

No single developmental theory has been published to satisfactorily encompass the range of psychopathology known to affect children and adolescents. Because of the wide range of children's problems (e.g. anxiety, abuse, distress, hyperactivity) and the wide range of domains in children's lives that require explanation (e.g. biological, familial, educational, psychosocial, cognitive), many theories with differing emphases have emerged to explain the many aspects of developmental psychopathology.

Often the best conceptualization of a particular disorder may be considered as an integration of different facets from different theories; often expressed in the simplest form within a bio-psycho-social conceptualization. The overarching developmental psychopathology framework is a foundational integrative conceptualization of psychopathology as it incorporates contributions from biological, behavioural genetics, cognitive-behavioural, attachment and family systems theory. Major theories within the framework were discussed, then compared with and contrasted against HoNOSCA items to provide theoretical critique of the HoNOSCA.

Overarching Developmental Psychopathology Theoretical Framework

The developmental psychopathology framework borrows concepts derived from the great theorists in embryology, the neurosciences, ethnology, psychoanalytic theory, clinical, developmental and experimental psychology and psychiatry (Rutter & Tizard,1990 as cited in Lewis, 1996). Pioneers of child psychoanalysis such as Anna Freud, Melanie Klein, Ernst and Marianne Kris, Erik Erikson, Donald Winnicott and John Bowlby contributed significantly to the emergence of the developmental psychopathology framework through their observation of children in naturalistic settings. The work of these visionaries exerted a profound impact on developmental psychopathology in relation to our understanding of stages of normal development. Concepts such as attachment theory and evolving representational models, personal identity, the constructive use of imagination, and the role of defensive mechanisms in the reduction of anxiety all emerged from the observation of analytic thinkers and subsequently contributed to the formulation of investigations of normal and atypical development (Cicchetti & Cohen, 1995).

The uniqueness of a developmental psychopathology framework lies in its focus upon normal and abnormal, adaptive and maladaptive, ontogenetic processes. In addition, this framework includes the principles of equifinality (a diversity of paths can lead to the same outcome), and multifinality (any one component may function differently depending on the organization of the system in which it operates). Unique to the developmental psychopathology framework is also the incorporation of resiliency factors, i.e. the ability of a child to overcome adverse environments and achieve healthy developmental outcomes (Phares, 2003), or the capacity of individuals to bounce back in the face of adversity to go on to live functional lives (Turner, 2001), as well as risk and protective factors. In addition, the framework also considers factors from the wider social environment in and by which the child is influenced, such as risk and protective factors and factors that promote resilience.

Consideration of risk and protective factors was considered important in understanding the gene environment interaction that potentially influences the severity of disorder in the child and adolescent population. Risk factors important to children and adolescents experiencing psychopathology may include factors that are external (intra-familial, social-environmental), and internal (biological, psychological) to the individual, and may promote pathological organization across the emotional, social, cognitive, linguistic and biological domains of development. In contrast, there are also enduring protective factors that promote competent adaption in the chid which may enhance development. These factors may compensate or counterbalance the effects of known risks and may operate interactively, influencing outcomes more potently under conditions of high risk and moderating or reducing the strength of the effects of high levels of risk.

Risk and protective factors are important in the developmental psychopathology framework when considering the severity of problems linked with psychological disorder. Risk and protective factors are linked with suicidal behaviours in adolescents. For example, Windle (2004) suggested that family history factors, directly and indirectly influence several domains of risk and protective factors. He stated that there are biogenic risks associated with a family history of suicide, major depressive disorders, and/or alcohol disorders that may contribute to dysregulation of important neurotransmitter systems such as serotonin and dopamine. These systems have been associated with adolescent depression and suicidal behaviours. Family history of suicide, major depressive disorder, and/or alcohol disorder have also been associated with poorer marital and parent-child relationships, thereby undermining key sources of emotional and developmental support that may buffer stress and reduce depressive symptoms and suicidal behaviour among offspring. Windle (2004) stated this set of risk and protective factors in turn influenced the occurrence of stressful events and, through ongoing bi-directional relationships across time, may decrease resources to cope with

these events (e.g. levels of family support may decrease as children become more deviant), as well as influence the expression of internalising and externalising problems. In turn, the constellation of those factors influences suicidal behaviours that range from thoughts about suicide to completed attempts. According to the diathesis-stress framework, the set of risk and protective factors has an impact on the probability of stressful events in multiple contexts, internalising (emotional) problems, externalising (behavioural) problems and responses to the attendant stressful events and behavioural and emotional problems.

Resilience, risk and protective factors are all considered important features of the developmental psychopathology framework (Cicchetti & Toth, 1995). Such a perspective places emphasis on the protective nature of appropriate social support and interaction such as that gained from linkages with friends and family, community supports, schools and groups. At the larger level of the extra-familial context, resilient children had strong bonds with pro-social adults outside the family. Children and adolescents who did not have protective extra-familial links were considered at higher vulnerability to disorder and disorder severity. Therefore, as such factors appear to be closely associated with psychopathology and disorder severity in children and adolescents, it is likely that social problems or the degree of prosocial connectedness would be relevant to the development and severity of problems for children and adolescents.

The developmental psychopathology framework integrates major theoretical conceptualizations of psychopathology including contributions from biological and genetic theory, family and attachment theory and cognitive theory. A critique of the HoNOSCA against developmental psychopathology theory will determine whether contributions from major theories can be reflected in scale items.

Biological and Behavioural Genetic Theory of Child Psychopathology

The HoNOSCA was designed to measure a range of problems associated with psychopathology but does not appear to include any items that measure problems associated with biological or genetic predisposition. The omission of biological factors in the HoNOSCA may overlook significant problems associated with child and adolescent psychopathology. As suggested by the developmental psychopathology framework, a child's or adolescent's biological vulnerability has been considered to set the trajectory towards the development and severity of psychopathology. Psychiatric disorders often run in families, and research has implicated genetic factors in a variety of mental, developmental, and behavioural disorders of childhood onset.

The earliest theories of the biological basis of various psychological disorders suggest dysfunction of the Central Nervous Systems and key neurotransmitters (Goldsmith & Gottesman, 1996). For example, studies of patients with different anxiety disorders have found brain changes in the temporal lobes, amygdala, hippocampus, orbit frontal cortex, caudate nucleus and thalamus and research regarding the function of neurotransmitters has been conducted in the area of conduct disorder (Merikangas, Dierker & Szatmari, 1998). Furthermore, Hill (2002) states psychopathology is the manifestation of disordered processes in various brain systems that mediate psychological functioning. Thus, disturbances in such brain functions as perceptions, learning, thought, memory, emotions, communication and language have biological underpinnings.

Simplistic biological and genetic models were later broadened to account for the environmental influences upon the presentation of disorder. Behavioural genetics focuses on the connection between inherited genetic influences and environmental influences in relation to the development of psychopathology (Rutter, 2005). The goal of behavioural genetics research was to estimate the extent to which genetic and environmental factors contributed to

behavioural variability in the population. This involved decomposing the observed (phenotypic) variance of a trait into genetic and environmental variance components. Heritability, the genetic effect size, was considered the proportion of phenotypic variance that can be attributed to genetic factors and the remaining variance is attributed to environmental factors included prenatal and perinatal factors. Environmental variance was further decomposed into shared and nonshared environmental influences. Shared environmental variance is familial resemblance that was not explained by genetic variance. Thus shared environmental variance includes those environmental influences that are shared by family members and act to enhance familial similarity (Saudino, 2005).

Behavioural-genetic research supports the argument that biological influences need to be included in a scale that measures problems associated with child and adolescent psychopathology. A number of studies emphasize the importance of contributions from this theoretical perspective. For example, a number of twin studies have examined common externalising disorders such as attention deficit hyperactivity disorder, conduct disorder and oppositional defiant disorder (Merikangas et al. 1998). Oppositional defiant behaviour and oppositional defiant disorder are highly influenced by genetic as well as environmental factors. These disorders are associated with higher risk of later conduct disorder, antisocial personality disorder and substance abuse disorders (Hudziak, Derks, Althoff, Copeland & Boomsma, 2005). Evidence of family aggregation of oppositional and conduct problems exist particularly when compared with other forms of child psychopathology. Oppositional defiant behaviour co-occurs commonly with attention-deficit/hyperactivity disorder and as such is associated with severe morbidity and discrete genetic influences.

For the major internalising disorders, studies reveal different etiological balances. For example, generalized anxiety disorder appears to be influenced by genetic and non-shared environmental factors according to Kovacs and Devlin (1998). Legrand, McGue and Iacono

(1999) confirm this finding and found that 'enduring anxiety' was found to have a substantial genetic component compared to 'transient anxiety' for which no genetic influence was detected. Most studies of separation anxiety disorder have found that both non-shared and shared environmental influences, in addition to genetic influences, play a role in development of the disorder (Ehringer, Rhee, Young, Corley & Hewitt, 2006). Other studies of major depressive disorder also have shown it is influenced primarily by genes and non-shared environment, with negligible effects of shared environment. However, there is some evidence that shared environment may be more important at younger ages (Cronk, Slutske, Madden, Buholz & Heath, 2004).

In other behavioural genetic research, Hill (2002) speculated that the intrauterine environment influenced the development of attention deficit hyperactivity disorder as some children suffered subtle damage to the central nervous system and brain development during their fetal and perinatal periods. Furthermore, recent behavioural genetic research described schizophrenia as a developmental disorder and focused on non-genetic (prenatal and perinatal) environmental factors associated with increased susceptibility to schizophrenia (Maddux & Winstead, 2005). Given that considerable research has emphasized the importance of behavioural genetic theory in understanding the development of psychopathology in children and adolescents, it is possible that significant problems may have been overlooked by the absence of relevant items in the HoNOSCA.

The review of biological and behavioural genetic theory suggests that consideration of the interplay between biological make-up, genes and environment is central to a developmental understanding of psychopathology and the severity of associated symptoms. One may propose therefore, that measurement of the extent to which behavioural genetic contributions are included in a scale for children and adolescents may improve the content validity of the psychometric instrument. However, the apparent importance of the

contribution from biological and behavioural genetic theory appears to be absent from the HoNOSCA. It appears that the HoNOSCA has not included some of the most foundational concepts of developmental psychopathology and this absence may challenge the theoretical validity of the scale.

The absence of biological or behavioural genetic factors may be due to a number of design reasons. For example, the absence of biological or environmental genetic contributions may have been due to a lack of clarity in the design of the HoNOSCA. It is possible that ambiguity in the scoring rules for the HoNOSCA, or the tasks of rating of problems associated with biological contributions may have been considered too difficult. Furthermore, if the HoNOSCA was intended to measure only symptoms and social and behavioural impairment due to disorder, biological or genetic aspects of a young person's mental health may have been omitted. However, as other causal factors are included in the HoNOSCA, biological and behavioural genetic influences certainly could have been included.

It is surprising that the HoNOSCA has not included items that assess contributions from a theoretical point of view. In its current version, the inclusion notes in the Outcome Information System Clinician Manual (2003) for Item 12 made brief mention of heritability in that it stated that family mental health history should only be included for rating if it is considered to have an impact upon the child or adolescent. However, according to developmental psychopathology theory, the impact of biological predisposition and the behavioural genetic interaction cannot be ignored when considering the severity of a range of internalizing and externalizing disorders. One may argue that heritability and gene-environment interaction would have a continuous impact upon a child or adolescent throughout development and influence observed symptom severity and degree of impairment

associated with diagnosis prior to or within a discrete episode of service provision with a mental health service.

In clinical practice, the ability to estimate the degree of biological or genetic influence upon the development of disorder and problem severity may be helpful in guiding clinical decision making in terms of diagnosis, medical and psychotherapeutic interventions and clinical prognosis. Symptoms due to a biological disposition may be carried out though the collection of information about the mental health history of first and second degree relatives and whether stress and trauma was experienced by the mother while the child was enutero. For example, young people with a strong biological predisposition towards mood disorders (as rated by the presence of an immediate family history of depression) may have a different range of symptom severity, a different prognosis to those with reactive depression and may respond better to other intervention such as psychopharmacological interventions as compared to those with symptoms consistent with a reactive disorder. The inclusion of an HoNOSCA item rating the strength of biological predisposition may serve to reflect the aetiological differences between disorders. For example, an appropriate item might be 'Presence of mental health disorder in first degree relatives'. The inclusion of biological and genetic influences for measurement in the HoNOSCA may improve the theoretical validity of the scale and may have useful clinical implications, the extent of heritability possible from a parental history of mental disorder, prenatal or perinatal stressors such trauma or maternal exposure to drugs and alcohol during pregnancy.

Family Systems Theory

Contributions from within the family environment as described by the behavioural genetic theory are essential when considering the development and maintenance of psychopathology in children and adolescence. Family systems theory does appear to be reflected in the HoNOSCA with the inclusion of Item 12 which measures problems with

family life and relationships. Family systems theory suggests that children's emotional or behavioural problems are a reflection of problems within the family system and suggests that the child or adolescent who expresses problems (usually unintentionally) frequently provides the impetus for the family to get the help it needs (Conrad & Ho, 2001).

Within the wide variety of family therapy approaches are certain themes that apply to nearly all family theories of the development of psychopathology. One theme is that families have a tendency to want to maintain homeostasis even when distressing patterns have emerged (Wamboldt & Wamboldt, 2000). Another theme relates to interpersonal dynamics. For example, dysfunctional alliances within the family, enmeshment and disengagement (Cox & Paley, 1997) or inappropriate expression of emotion are frequently demonstrated in troubled families. Such dysfunctional family dynamics have been implicated in a number of disorders including the development of anxiety disorders as suggested by Crawford and Manassis (2001) who hypothesised that the family environment indirectly affects the acquisition of anxiety because parental psychopathology promoted more conflict and less cohesion in the home, which in turn contributes to the maintenance and/or enhancement of child anxiety.

The HoNOSCA has one item, Item 12 constructed to measure problems with family life and relationships. This single item does appear to reflect some connection with family systems theory. The Outcomes Information System Clinician Manual (2003) scoring rules outlined a range of problems that may be included in Item 12 'Problems with family life and relationships'. Some problems included for scoring on this item that reflect family systems theory include problems that potentially contribute to the development of disorder such as parental neglect or rejection, over-restriction, sexual or physical abuse (Chorpita & Barlow, 1998). Furthermore, sibling jealousy, physical or coercive sexual abuse by siblings, problems with enmeshment and overprotection and family bereavement were also included. This item

also included problems that may also be considered to be 'perpetuating' such as parent-child and sibling relationship problems, problems with foster parents, social workers or teachers in residential placements and relationships in the home with separated parents and siblings, such as poor communication, arguments, verbal or physical hostility, criticism and denigration.

Problems with communication difficulties, hostility, rejection, interpersonal problems, abuse and neglect as measured by Item 12, do appear to reflect the themes that apply to family systems theory. However, family systems theory also suggests other factors that have not been included in any HoNOSCA item (such as the degree of family stress, parental coping styles, the presence of mental health disorder in parents and problems such as drug and alcohol misuse) should also be included to reflect a wider range of theoretical considerations.

Attachment Theory

Attachment theory is considered to be a central theory within the developmental psychopathology framework. However, the HoNOSCA does not appear to include any item measuring problem associated with attachment. Attachment theory highlights the importance of conceptualizing psychopathology across theoretical domains and it builds upon biological, behaviour genetic and family theories of psychopathology development as reviewed previously.

Attachment theory postulated by Bowlby (1988) suggested that emotional connections between individuals have survival value. Attachment behaviours have neural corollaries in the structure of the central nervous system and each partner in an attachment dyad builds internal mental representations of the other (i.e. working models) in order to maintain a sense of proximity in the event of separation. In addition, Bowlby suggested development occurs continuously, rather than in discrete phases as described by early psychodynamic theory. Of particular theoretical importance, Bowlby proposed that the

attachment styles developed and internalised in early childhood are perpetuated across the subsequent life span and have direct impacts on adult mental health.

In order to test Bowlby's theory, Mary Ainsworth and her colleagues (Ainsworth, Blehar, Waters & Wall, 1978) developed the 'Strange Situation' paradigm in order to study the behaviours of infants who were separated temporarily from their mothers. Out of this research, Ainsworth identified three infant attachment styles: secure, anxious-ambivalent, and avoidant (Shorey & Snyder, 2006).

Contemporary researchers continued to test Ainsworth's findings and identified a fourth childhood attachment style: disorganised attachment that lacks consistent behaviour patterns (Carlson, 1998; Main, 1996). This disorganised attachment style is characterized by chaotic and conflicted behaviours in response to the Strange Situation task. Such observed behaviours have included children exhibiting simultaneous approach and avoidance behaviours (i.e. approaching the caregiver and then freezing midstride). The advantage of adding this disorganised attachment style was that it allowed for the classifying of children who previously did not fit into any of Ainsworth's original categories according to Shorey & Snyder (2006).

Attachment research provides evidence for the importance of conceptualizing psychopathology in terms of security of attachment. For example, disorganised attachment appears in research to be much higher in clinical and high-risk groups with up to 80% in samples with a history of maltreatment or drug abuse compared to 15% in low-risk families. Green and Goldwyn (2002) discovered a striking association between disorganised attachment behaviour in infants and evidence of unresolved experiences of loss or trauma in parental development. Other studies showed an association between infant disorganisation and severe or chronic maternal depression or bipolar disorder (Lyons-Ruth & Jacobvits, 1999, as cited in Cassidy & Shaver, 2002). For example, Carlson (1998) investigated the

relationship between disorganized attachment at age two and later attachment style and adjustment at age 19. Children of mostly single (68%) and low-educated mothers (39%) had not completed high school) were assessed at ages 12 months to 18 months using the Strange Situation procedure, and ages 17.5 and 19 were assessed for psychopathology using the Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS) (Ambrisubu, Metz, Prabucki & Lee, 1989). The results revealed that disorganized infants, relative to the infants with other attachment styles, exhibited significantly more problems throughout their developmental histories.

The literature suggests that attachment style is implicated along the developmental trajectory with many psychological disorders in infancy, through childhood into adulthood. Several studies with nationally representative samples of adolescents and young adults have found strong relationships between attachment styles and psychopathology (Cooper, Shaver & Collins, 1998). Relative to avoidant and anxious-ambivalent participants, those with secure styles experienced significantly less general anxiety, panic, social and simple phobia, agoraphobia, Post Traumatic Stress Disorder, obsessive-compulsive tendencies, paranoid ideation, psychosis, somatisation, mania, dysthymia and depression (Cooper, Shaver & Collins, 1998). Consistent with findings in the infant attachment literature it was found that anxious-ambivalent children experience intense anger, and anxious-ambivalent adolescents manifested higher levels of hostility and depression than either their avoidant or secure counterparts (Shorey & Snyder, 2006).

Research appears to suggest that the omission of an item on the HoNOSCA measuring problems associated with insecure attachment may be a significant oversight. Attachment style may be considered to impact significantly upon the mental health of children and adolescents and may be considered an essential theoretical paradigm upon which to base HoNOSCA items. Attachment theory can contribute to our understanding of the

etiology and maintenance of pathological states and attends to biological influences within the child and the genetic influence from parents. It attends to the development of early childhood schemas and patterns of reinforcement. Attachment theory accounts for interactions between the child and the environment thus supporting the biological and behavioural genetic theories, and supports the diathesis stress model of psychopathology symptom development. It is one of the most empirically studied theories and predicts the development of psychopathology through childhood and adolescence and into adulthood.

Due to the importance of attachment theory, a scale omitting contributions from attachment theory could be considered less than developmentally relevant. As described in the literature, the quality of family relationships and attachment in early childhood has been empirically linked to later psychopathology and to the severity of symptoms. An example of a potential item reflecting attachment theory may be 'Problems with bonding and attachment' and the scoring guidelines could be adapted to assist clinicians to base ratings on major indicators of insecure attachment. Given that the HoNOSCA appears to lack consideration of attachment theory, the scale may overlook major bio-psycho-social factors affecting the severity of a range of disorders relevant to children thus reducing the content validity of the scale.

It may be argued that the inclusion of only one HoNOSCA item measuring some problems associated with family life and relationships only reflects partial theoretical validity. Furthermore, the theoretical foundations and validity of the HoNOSCA could potentially be improved by the inclusion of items rating the intensity of family stress, quality of coping and management strategies and quality of attachment which could be rated by a clinician within the designated HoNOSCA rating periods.

Cognitive and Schema Theory

As highlighted within the review of attachment theory, cognitive and schema processes were also linked to the development and maintenance of psychological disorder. However, the HoNOSCA does not appear to have an item which reflects cognitive theory. A review of cognitive literature was conducted to argue that cognitive and schema theory is relevant to the child and adolescent population and that the inclusion of cognitive items may improve the content validity of a scale measuring problems associated with child and adolescent psychopathology.

Cognitive theory is used extensively to conceptualize psychopathology. The most widely known cognitive model that focuses on dysfunctional structures was proposed by A. Beck and has been revised since (Beck, 2002). According to Beck, depression results from specific cognitive distortions present in persons prone to depression. Those distortions, referred to as depressogenic schemata, are cognitive templates that perceive both internal and external data in ways that are shaped by early life experiences and dysfunctional cognitions or schemas are the central elements in the onset and maintenance of many disorders including depression (Sadock, Kaplan & Sadock, 2004). Beck specifically drew attention to the 'negative cognitive triad' in depressed clients where such clients had an unrelenting tendency to view themselves, their current experience and their future in negative terms. These negative thoughts are automatic and distorted. The cognitive triad served to maintain the disorder (depression) and interfered with problem-solving real-life problems (Chorpita & Barlow, 1998). The cognitive triad of depression is a negative self-perception whereby people see themselves as defective, inadequate, deprived, worthless and undesirable. They have a tendency to experience the world as negative, demanding and self-defeating and expect failure and punishment; they have an expectation of continued hardship, suffering, deprivation and failure (Harris & Curtin, 2002). Such cognitive conceptualizations are

consistent with attachment theory that highlights the notion of maladaptive schema development arising from insecure attachment.

Cognitive theory has been developed to include schema-based theory. A schema based theory of cognition suggests that from early childhood, individuals organize and integrate the personal meaning of information from the environment into frameworks that shape core beliefs, assumptions and judgments made about self, others and the world (Teasdale, 1997, as cited in Clark & Fairburn). Such schemas give rise to automatic thoughts and are linked to various feelings and emotions. Schema-based theory has impressive explanatory power and has been applied to a range of psychopathology including core symptoms of PTSD (Horowitz, 1997).

With reference to trauma related disorders, schema-based theory was initially criticized for being limited and was subsequently expanded to include associative network theories, dual representation theory, and resulted in an integrated model for understanding trauma responses. Developed by Foa, Steketee and Rothbaum (1989), the associate network theories of cognition incorporated the idea of a network of schema representations connected by theme. Network theory provided an impressive account of many of the core data of PTSD. However, a criticism of the associate network model of cogitation was that it lacked a means by which representational content can be directly manipulated by processes grounded in natural language. Dual representation theory was therefore developed to enhance associate network theory and extended the associate network theory. This traumacentric model was developed by Brewin, Dalgleish and Joseph (1996) to distinguish between verbally accessible memories and situationally accessible memories. Verbally accessible memories are characterized by their ability to be deliberately retrieved and progressively edited by the traumatized individual, and they are fully contextualized within the person's autobiographical database. Situationally accessible memories contain information that cannot be deliberately

accessed verbally by the individual and are not available for progressive editing. Holistic, dissociative memories or flashbacks, dreams, and trauma-specific emotions would be considered to be the result of the activation of situationally accessible memory representations.

Cognitive theory offers a great deal of insight into the development and perpetuation of many psychological disorders, particularly trauma related disorders. Furthermore, cognitive or cognitive-behavioural therapy is one of the major evidence based therapies used by clinicians to treat a variety of disorders. Cognitive and schema theory suggests that from early childhood cognitive templates are formed which are used to interpret the self, relationships and the world. These templates, left unchanged may develop a trajectory of disorder from childhood, through adolescence into adulthood and may be considered to be significant symptoms of particular disorders. For example, very young children may form strong maladaptive cognitions such as 'Don't trust adults', 'I am stupid', 'I am bad' or 'I cannot cry or else I will get hurt' which may develop into defectiveness or mistrust and abuse schemas in adulthood. Therefore, it would be expected that the degree of maladaptive cognition or schema development, often considered a significant perpetuant of disorder, would be highly associated with the severity of disorder as suggested in theory and subsequently be a relevant item for measurement within the HoNOSCA. Drawing from these examples, an appropriate item that could be included in the HoNOSCA may be 'Presence of maladaptive cognitions'.

The HoNOSCA does not appear to contain one item directly reflecting cognitive theory. Cognitive distortions and maladaptive schemas may be considered to be symptoms associated with a range of disorders including mood and anxiety disorders. Therefore, the scoring rules of the HoNOSCA do allow the inclusion of items measuring the severity of such distortions. The adaptiveness or maladaptiveness of cognitions or schemas can be

assessed and rated very easily by a clinician through various techniques within the specified rating period.

In summary, cognitive theory is a foundational theoretical framework along with biological and family and attachment theoretical frameworks in understanding the development of child and adolescent psychopathology. Therefore, given the absence of any significant contribution from these theories in the HoNOSCA, it is probable that the theoretical validity of the HoNOSCA could be improved by inclusion of items reflecting these theories.

The HoNOSCA appears to have two items which reflect other aspects of the developmental psychopathology framework. For example, social connectedness concepts are reflected in Item 10 'Problems with peer relationships'. This item includes problems with school mates and the social network. These problems can be considered as potential risk factors including problems such as active or passive withdrawal from social relationships or problems with over-intrusiveness or problems with the ability to form satisfying peer relationships. This item allows for inclusion of social rejection as a result of aggressive behaviour or bullying. Item 11 was also considered to tap into another important area of social supports as it measures poor school attendance. This item includes truancy, school refusal, school withdrawal or suspension for any cause. If moderate to severe problems are rated on this item, it may be considered that the child is not receiving pro-social support from such avenues and is therefore at higher risk of mental health problems. In summary inclusion of items 10 and 11 on the HoNOSCA appeared to reflect theoretical foundation and therefore these items could be considered to support the theoretical validity of the HoNOSCA.

Conclusion

The theoretical validity of the HoNOSCA was explored in this study through a critique of the HoNOSCA items against major theories of developmental psychopathology.

The matching of the HoNOSCA items against major developmental psychopathology theories supports the hypothesis that contributions from theory might strengthen the content validity of the scale. Certainly, the HoNOSCA has a small number of items that do reflect sensitivity to developmental theory and issues relevant to children and adolescents. There is also an item measuring problems with family life and relationships such as abuse, hostility, neglect and overprotection which is well reflected in theory. This item is not included on the HoNOS and is considered to be developmentally sensitive and unique to the child and adolescent population. Similarly, the inclusion of items measuring social and school problems is considered to reflect contributions from developmental psychopathology theory.

In conclusion, it is likely that the HoNOSCA may be improved through the simple inclusion of additional items reflecting contributions from theory. Not every theoretical perspective can be reflected in a scale but it has been argued that items measuring biological and behavioural genetic influences, attachment quality, cognitions and schemas could easily be included and may possibly improve the theoretical grounding of the HoNOSCA. Such additions are unlikely to make the scale cumbersome or time consuming to rate and may only add a few minutes to scoring. Furthermore, such changes may enhance the scale's meaningfulness and may guide clinical decision making more specifically.

Study 2: A Focus Group Examining the Face Validity of the HoNOSCA

The first study in this research project explored the content validity of the HoNOSCA through a critique of the HoNOSCA items against major developmental theories. The critique revealed relatively few items reflected any one of these theories. It was therefore suggested that contributions from theory may improve the content validity of the HoNOSCA. The goal of this second study is to further test the content validity of the HoNOSCA through examining its face validity. Both studies culminate in providing suggestions to improve the content validity of the scale.

By way of a rationale for this study, a review of current published literature regarding the HoNOSCA was conducted, finding no studies pertaining to the face validity of the scale. However, some investigation has occurred in regards to the face validity of the HoNOS through asking consumer and carer advocacy group members and mental health professionals to comment on whether the HoNOS items reflected areas of concern for them (Shergill, Shankar, Seneviratna & Orrell, 1999; Orrell, Yard, Handysides & Schapira, 1999; McClelland et al. 2000). Comments from clinical staff and consumers were found to be mostly positive suggesting that the content of the HoNOS was appropriate, well designed and thorough. However concerns were raised by respondents regarding restrictions imposed by the rater being forced to indicate only one problem in Item 8 'Other mental and behavioural problems', subjective anchor points, and regarding the possibility of the HoNOS being open to human error and interpretation (Pirkis, Burgess, Kirk, Dodson, Coombs & Williamson, 2005).

As the review of current of literature suggests, few studies have tested the theoretical and face validity of the HoNOS and none have explored the HoNOSCA. This provided the opportunity for the current research to further explore the content validity of the HoNOSCA.

Aim and Hypothesis

In order to explore the content validity of the HoNOSCA through another process, the face validity of the scale items was examined in a small study with a team of CYMHS clinicians. A focus group meeting was conducted with CYMHS staff to discuss whether they considered the HoNOSCA measured the mental health, social and behavioural functioning of children and adolescents.

The initial process firstly determined the nature of clients and the problems encountered by the team. As previously cited, HoNOS face validity studies produced positive

results. Therefore, it was hypothesised that the HoNOSCA would similarly be perceived by staff to adequately reflect a range of problems encountered by the child and adolescent population. Furthermore, it was hypothesised that the HoNOSCA would make logical links between item elevations and problems typically associated with particular diagnoses.

Method

Participants

The focus group included members of the entire Toowoomba CYMHS multidisciplinary team that consisted of eleven members including three psychologists, two social workers, three nurses, an occupational therapist, the consultant psychiatrist and a speech pathologist. Two members of the team had been with CYMHS for more than four years, and two had more than eight years experience. The rest of the team had been with the service for a range of time from two months to eighteen months. Three of the team were males and eight were females. The clinicians ranged in age from early twenties to late fifties.

Procedure

The researcher facilitated the focus group as part of a usual in-service training team meeting. This forum was selected because all staff usually allocated time in their schedules for this meeting as all staff participated in the in-service activities. Goal directed discussion was facilitated by the researcher. A number of key exploratory questions were selected by the researcher to guide discussion about the nature of the clinician's work, about the clients they typically treated, and the problems these clients presented with. Clinicians were asked for their perceptions of the client demographics, major diagnostic categories clinicians treated, and how long children and young people sought therapy by the service. Clinicians were asked about whether they drew any links between particular disorders and patterns of problem severity as outlined by the HoNOSCA. The stimulus questions are for viewing in Appendix A.

The content of the discussion was recorded by the researcher by writing key points of discussion on an electronic white board as the discussion progressed. All team members therefore followed a visual record of the points raised in the discussion thus allowing further reflection. This information was printed out as a hard copy at the conclusion of the focus group discussion. The full discussion was also recorded by an administration assistant and recorded as formal minutes. Using two records of the discussion served to minimize the risk of significant information being biased or overlooked. The whiteboard data and recorded minutes data were checked against each other as the information was categorised and thematically analysed. During analysis the researcher ensured the security and confidentiality of information was maintained.

This focus group discussion was considered to be a true reflection of the team's perceptions of the HoNOSCA. All staff appeared relaxed and comfortable discussing their views of the nature of the clients and the utility of the HoNOSCA. The team interviewed in this research project consisted of multidisciplinary team members as typical across other mental health services. In addition, this team treated the same demographic and similar range of problems as other CYMHS teams. In this light, comments made by this team may reflect comments by other CYMHS clinicians.

Results

The nature of the service and clients were first described to contextualise this study. The Child and Youth Mental Health Service are mandated by policy to provide clinical services to children from infancy to eighteen years of age. Clinicians work together as a multidisciplinary team and primarily treat any mental health disorders that are considered severe and complex or those disorders that cannot be adequately treated by individual service providers due to multidisciplinary requirements. One clinician is allocated case management responsibility but the other staff members offer discipline-specific assessment and

intervention depending on case plan requirements. A CYMHS clinician is responsible for conducting a full clinical assessment with the child or adolescent, creating a formulation of the problem, making provisional diagnoses and developing an individual treatment plan. Within the case conference process, the assessment, diagnosis and treatment plan are validated by the multidisciplinary team and the consulting psychiatrist. Outcome measures, particularly the HoNOSCA, are also reviewed in this process.

In terms of the clients treated through this CYMHS, clinicians suggested they treated more adolescents from the ages of twelve to eighteen than children from four to eleven years of age. Clinicians said they did not treat many children under the age of four years. One social worker suggested the reason for this was that children under the age of four were frequently treated by other teams such as the Child and Family Health team, the Developmental Assessment Clinic, or Early Intervention specialists.

CYMHS clinicians were asked their opinion on whether they thought the HoNOSCA items linked logically to diagnoses given to children and adolescents. All agreed that elevations on some HoNOSCA items were consistent with features of diagnoses given. For example, clinicians found scores on Item10 'Problems with peer relationships' were typically rated higher in children diagnosed with disorders including Autism or Asperger's Syndrome because social problems were considered one diagnostic feature of children with developmental disorders. All clinicians agreed scores on Item 4 'Problems with alcohol, substance or solvent misuse' tended to be rated higher in adolescents diagnosed with drug induced psychosis. Furthermore, the speech and language pathologist said she typically found scores on Item 5 'Problems with scholastic or language skills' were higher in children diagnosed with a speech and language disorder. However, the comment was made that the HoNOSCA item was not specific enough to inform what specific kind of problem was being experienced. Clinical staff stated they found scores on Item 1 'Problems with disruptive,

antisocial or aggressive behaviour' were rated higher in children diagnosed with attention deficit hyperactivity disorder and scores on Item 9 'Problems with family life and relationships' were rated higher in children whose families were abusive or in children who were diagnosed with an attachment disorder. This finding supported the hypothesis that the HoNOSCA sufficiently reflected a range of problems relevant to diagnoses experienced by children and adolescents. These finding supports the hypothesis that the HoNOSCA was perceived by staff to logically link with the diagnoses given to children and adolescents.

Some problems on the HoNOSCA were perceived to require caution when rating. A senior clinician stated caution was required with clinician ratings on Item 7 in very young children. The comment was made that clinicians have at times inaccurately rated elevation on Item 7 'Problems with hallucinations, delusions or abnormal perceptions' in very young children with severe anxiety. This clinician said that young children often 'hear their stress thoughts' or 'see monsters' and this was considered a symptom of severe anxiety in this age group and not a psychotic symptom as it may be described in the adult population. The clinician said in this case, a higher rating on Item 9 'Problems with emotional and related symptoms' would have been more accurate.

Clinicians were asked other questions about the HoNOSCA in order to explore their perceptions of the utility of the scale. Although all staff had received training in how to rate and enter outcomes including HoNOSCA information, clinicians appeared to vary in their application of the HoNOSCA data. One staff member described using the HoNOSCA items as the structure of an entire psychiatric assessment which gave rise to the diagnosis and development of the treatment plan. Other staff did not use the HoNOSCA in this way but used it as to demonstrate their assessment was comprehensive including the 15 questions. Some staff stated that some questions were very hard to rate (e.g. problems with scholastic skills) especially upon assessment and stated that they would frequently enter a '9' into the

system indicating information was 'unknown' resulting in an incomplete representation of problem severity.

Some clinicians commented that they were not sure what the scale was supposed to be; a symptom severity checklist or a scale that assessed life events effecting children and adolescents, or a combination of both. Due to this confusion, some clinical staff suggested that the two-week rating period in which problems were assessed gave an inaccurate rating of particular problems. For example, a clinician may have assessed that a long-term history of intra-familial abuse influenced the presentation of disorder but because the abuse had not actively occurred within in the two weeks prior to taking the measure, was not rated as a significant problem. Furthermore, a psychologist commented that the HoNOSCA was not a proper psychological measure because it was not a standardized scale with relevant national norms but was just a tool to communicate general problem areas, inform a clinician where to focus intervention and allow measurement of change in severity over time.

CYMHS clinicians were asked whether elevations in HoNOSCA item scores related to lengths of service episodes. Staff indicated they did not believe that higher HoNOSCA scores necessarily linked to longer service episodes. The team leader stated that it depended on what problems were considered more severe. He said that a child may have physical illness or disability problems that were quite severe as well as some mild anxiety. He said that this kind of case may be quite quickly referred to a disability service after some brief therapy to reduce anxiety symptoms especially if the anxiety problems related to the disability. The consultant psychiatrist gave another example where a young person had a drug- induced psychosis. The adolescent had a brief inpatient admission and was then referred to the Alcohol, Tobacco and Other Drug Service (ATODS) for follow up counselling and case management, thus resulting in a shorter service episode than if a CYMHS clinician conducted drug counselling. On the other hand, one of the nursing staff stated that she had

one client with only one very high item elevation on the HoNOSCA. She described a young person with a diagnosis of obsessive compulsive disorder who had high scores on the emotional related symptoms item but low scores on other items and this person had been open to the service for more than two years due to the length of time required for effective treatment and relapse prevention planning. Clearly, staff did not perceive any typical pattern of item elevation linking to lengths of service episode and it appeared that lengths of service episode depended on many other factors outside of the HoNOSCA scope.

Conclusion

Experienced clinicians perceived the HoNOSCA to have face validity. Clinicians perceived items to be consistent with key features of diagnoses. According to this sample of clinical staff, the HoNOSCA does appear to contain items that measure what it was designed to measure being problems associated with specific aspects of child or adolescent mental health.

Having face validity, the HoNOSCA was found by clinicians' to be generally helpful in reflecting the severity of many problems found through the assessment process and helpful in tracking change during a service episode. Staff also saw great value in displaying the HoNOSCA profile for each consumer during case conference so that it could be appraised by other team members. Staff perceived the HoNOSCA to logically link to symptoms or issues associated with various disorders. Furthermore, the HoNOSCA was considered a useful instrument that guided assessment across a number of typical problem areas for children and adolescents.

Clinical staff did perceive some shortcomings with the HoNOSCA. Similar to the comments made in the Pirkis et al (2005) HoNOS study, the HoNOSCA too may be open to misinterpretation. In particular, if clinicians did not have specific developmental knowledge

items such as Item 7 ‘Problems with hallucinations, delusions or abnormal perceptions’ may be misinterpreted and erroneously rated.

Another shortcoming of the HoNOSCA is that it was not perceived as particularly meaningful because scores are not based on Australian normative date. The HoNOSCA was perceived more as a simple tool that could be used to graphically summarise a number of immediately relevant problem areas so that the team could track a client’s progress in these areas during an open service episode of therapy and case management. However, the HoNOSCA appeared to reflect generally problem areas rather than specifics. Confusion existed regarding whether the HoNOSCA rated severity of predisposing or perpetuating factors which are also known to give rise to the severity of symptoms at any given time period suggesting ambiguity exists in the scoring rules.

Discussion

Until now, a paucity of current research existed regarding the content or theoretical validity of the HoNOSCA although a growing number of research publications have focused upon other validity and reliability aspects of the scale. Even though the HoNOSCA has been rolled out and is in use throughout the nation, the current studies are apparently the first exploratory research to investigate the content validity of the HoNOSCA; the first to critique the scale and to question whether it measures what it was intended to measure.

After comparing the HoNOSCA and HoNOS items, it was observed that the HoNOSCA was strikingly similar to the HoNOS as half of the items were either identical or only showed minor differences in wording. As a result, it was argued that the HoNOSCA was not a unique developmentally sensitive child and adolescent scale steeped in developmental theory although the HoNOSCA does contain some very important items that do reflect developmental psychopathological theory, such as the item measuring problems with family life and relationships.

The first content validity study proposed that developmental psychopathology theory would therefore contribute to the content validity of the scale and subsequently enhance the scale's developmental sensitivity. This task was considered as highly important for the clinical application of the HoNOSCA given that its purpose as a routine outcome measure is to assist in the monitoring of the health and well being of the child consumer, inform clinical treatment decisions and be used as a tool to evaluate the effectiveness of interventions delivered by the service.

The results suggested that the HoNOSCA has a small number of items that reflect developmental psychopathological theory and issues relevant to children and adolescents. The scale includes an item measuring a range of family related problems which reflected theory of family functioning and drew a distinction between HoNOS and HoNOSCA scales. Similarly, items measuring social and school problems are considered to support the content validity of the scale.

It is suggested that the HoNOSCA might be improved through the inclusion of items reflecting contributions from theory. For example, it has been argued that items measuring biological and behavioural genetic influences, attachment quality and style, cognitions and schemas as suggested by theory, could improve the theoretical grounding of the HoNOSCA.

Following the theoretical critique, the content validity was further examined by exploring the face validity of the scale. This was tested through discussion with a team of informed CYMHS clinicians on how well they perceived the HoNOSCA reflected symptoms of young people's mental health. The HoNOSCA was perceived by clinical staff to have logical links between item elevations and typical symptoms of disorder. For example, elevations on Item 2 'Problems with over-activity, attention or concentration' were logically linked to diagnoses such as Attention Deficit Hyperactivity Disorder. This finding supported a function of the HoNOSCA, the rating the severity of some symptoms. However, further

revision of the HoNOSCA and the scoring rules may benefit from clarifying whether the HoNOSCA should allow the rating of predisposing or causal factors as well as effects such as symptoms and associated impairments. The results suggested that the HoNOSCA adequately reflects a range of problems experienced by children and adolescents seen by these clinicians.

The small face validity study was not without its limitations. This focus group discussion was held with one CYMHS team located in a regional Queensland community. The results from discussion with this team may not necessarily reflect the perceptions of other staff in other teams throughout Queensland or Australia and should be interpreted with caution. Generally, limitations of a focus group discussion may include the chance that group conditions may force some members to hide their true opinions and some participants may choose not to participate. At times, a group may intentionally or unintentionally mislead the discussion facilitator and there may be difficulties with keeping the discussion on track (Sarantakos, 2002). However, during this focus group discussion, the team appeared to participate freely as all members were reported to be interested in the research as it was designed to assist them in service provision. During the discussion, debate occurred about some points between clinicians indicating the ability of staff to speak openly and honestly.

In summary, the content validity exploration in essence draws the conclusion that further research is warranted to investigate whether the HoNOSCA can possibly be improved by drawing content from developmental psychopathology theory. In addition, the scoring rules dealing with inclusion and exclusion of problems could also be improved.

CHAPTER 3

Part B: Exploring the Construct Validity of the HoNOSCA

Study 3: Analysis Across Diagnostic Categories

The HoNOSCA items were designed to be condensed into four subscales within both the HoNOS and HoNOSCA. The four subscales were intended to consist of the behavioural, impairment, symptom and social subscales. The subscale scores were intended to provide clear summary information to guide clinical application and track change in scores during a service episode. Initial investigations into the validity and reliability of the scales have been undertaken (Gowers et al. 2000). However, further research has brought the construct validity of the HoNOS and subsequently the HoNOSCA into question (Pirkis et al. 2005).

Prior to critiquing the construct validity of the HoNOSCA, the psychometric properties of the HoNOS are first discussed given that the HoNOSCA was adapted from the original HoNOS. Confirmatory factor analyses have been carried out on the factor structure of the HoNOS leading to debate as to whether a four-factor structure can be confirmed. The internal consistency of the HoNOS was tested and studies show the Cronbach's alpha ranges from 0.59 to 0.76 indicating acceptable internal consistency and low item redundancy thus supporting the instrument's use as a meaningful summary of severity of symptoms (Pirkis, et al. 2005). Preston (2000) found that the four factor model defined by the original subscales had good fit, but that the contribution of individual items to the respective subscales varied in two separate mental health services, indicating differentiation in construct interpretation.

Examination of the HoNOS by Trauer (1999) revealed a poorer item-factor fit than Preston's analysis which led Trauer to propose an alternate five-factor structure which was supported in later studies such as that by Eager, Trauer and Mellsop (2005). The five-factor proposed structure included five subscales. Subscale A 'Hallucinations/delusions', including items measuring problems associated with hallucinations and delusions, Subscale B

'Behaviour', including items measuring aggression and drug and alcohol misuse, Subscale C 'Social' including items measuring problems associated with accommodation, occupation, leisure and activities of daily living and relationships, Subscale D 'Impairment' measuring problems associated with cognitive problems and physical problems and Subscale E 'Depression' measuring problems associated with depressed mood, other symptoms, deliberate self-harm and relationship difficulties. Testing the internal consistency of this model, results indicated acceptable Cronbach's alpha values on the subscales and the total score.

Reliability and Validity Studies of the HoNOSCA

Some studies have recently emerged examining the reliability and validity of the HoNOSCA. For example, the HoNOSCA has been examined in field studies in the United Kingdom. In an initial study, Yates, Gerralda and Higginson (1999) examined the sensitivity of the HoNOSCA and the Paddington Complexity Scale (PCS) in describing the intakes of child and adolescent mental health clinics. Clinician rated HoNOSCA and PCS data were obtained from 248 new attendees. Both scales proved sensitive to intake differences between two out-patient units. The results found that there were correlations of moderate intensity ($r = 0.6$) between total HoNOSCA and PCS.

Further assessment of the HoNOSCA was conducted through the Commissioned Review by Gowers, Bailey-Rogers, Shore and Levine (2000) who reviewed the studies that assessed the validity and reliability of the scale. The HoNOSCA was tested on a sample of 1276 patients across 36 cites. In the sample 7% of patients were under five years of age, 50% were aged between five and twelve years, and 43% were aged thirteen and above. Males accounted for 56.6% of the sample, 89% were white, 88% were outpatients at the time of the initial assessment and 71% were in ordinary schools. Regarding validity, the subscale scores were found not to be correlated with each other (mean correlation = 0.13, range of

correlations = 0.01-0.41), suggesting that each of the subscales carried independent weight. Gowers et al. (2000) also found the HoNOSCA demonstrated sensitivity to change with a mean overall reduction in total score of 38% over time. The HoNOSCA also produced results with apparent discriminant validity. The mean scores for inpatients was 15.51 (SD = 7.19) compared with a mean score for outpatients of 11.18 (SD = 5.30), a statistically significant difference ($t = -8.03$, $df = 1141$, $p < .001$, 2 tailed). Furthermore, inter-rater reliability was established for 20 cases, who were rated simultaneously by three raters. There was good inter-rater reliability, with intra-class correlations greater than 0.8 for 8 of the 12 main scales for which a value could be computed.

In Australian samples, some studies have investigated the validity and reliability of the HoNOSCA. The first study was conducted in Victoria by Brann et al. (2001) who conducted a reliability study of the HoNOSCA. They tested inter-rater reliability between two class groups of staff using vignettes during a staff training program. Interclass correlations were used to estimate interrater reliability using a two-way random effects model with interaction. The total score interclass correlation of 0.72 suggested the HoNOSCA was used with a good degree of reliability.

The study by Brann et al. was conducted under normal clinical conditions using 458 patient records of children and adolescents in a Child and Adolescent Mental Health Service in Victoria. They found a relationship between HoNOSCA and age. Adolescents had the highest scores on self-injury, substance use, hallucinations and school attendance while the preschool group showed the greatest difficulties with concentration. Boys scored higher on scales relating to externalizing behaviours (e.g. disruptive, concentration/over activity) while girls scored highest on emotional symptoms, self- injury, hallucinations and substance use. Brann et al. found that neither gender had a significantly higher total score suggesting that while the pattern varied, the total number of problems was perceived to be similar. Results

from this study revealed a 22% improvement on change scores from assessment to the end of the study. This improvement was less than the improvement of 38% noted by Gowers et al. (1999). However, Brann et al. (2001) state that the presence of ongoing patients in their study may have diminished the rated improvement and suggested that it is equally possible that more effective treatments or a different population is being treated in the United Kingdom.

A Victorian study by Mathai, Anderson and Bourne (2004) used the HoNOSCA scores as a comparison to assess the usefulness of the Strengths and Difficulties Questionnaire (SDQ) as an outcome measure following clinical intervention (approximately 6 months after initial referral). Changes in SDQ scores were compared to changes in clinician-rated HoNOSCA scores. Although the retention rate was low for the study (34%), the study confirmed research such as that conducted by Gowers, Harrington and Whitton (1999) that in the six months following referral to a Child and Adolescent Mental Health Service (CAMHS), children exhibited fewer problems on the SDQ and HoNOSCA. In the study, the mean change at follow-up for the HoNOSCA was 4.5 (SD=4.97) and the level of improvement averaged 38%.

A study conducted in Queensland by Harnett, Loxton, Sadler, Hides and Baldwin (2005) aimed to examine the reliability and validity of the HoNOSCA in a sample of adolescents requiring medium to long-term in-patient psychiatric treatment and to examine the association between HoNOSCA scales and age, gender and length of treatment. Test-retest validity was calculated from the initial HoNOSCA score and a subsequent score provided two to four weeks later. It was expected that within an in-patient sample that functioning would remain relatively stable once the adolescents had a period to settle into the unit. HoNOSCA scores were found to be stable over this period ($r = 0.80$, $p < .001$).

The convergent validity of the HoNOSCA was also assessed by comparing the HoNOSCA to the PCS which is another measure of clinical and environmental complexity

regarding psychopathology. They found that there was a moderately strong positive correlation between total HoNOSCA and PCS ($r = 0.46$, $p < 0.01$) showing higher HoNOSCA scores at intake were associated with more complex presenting problems. The mean PCS scores at intake (n =11.80, sd = 3.95) were associated with higher scores on several items of the HoNOSCA at intake, including overactivity/aggression ($r = 0.66$, $p <$ .001, one tail), scholastic/language problems ($r = 0.26$, $p < .05$, one tail), peer relationships ($r = 0.33$, $p < .05$, one tail) and self-care and relationship problems ($r = 0.33$, $p < .01$, one tail) (Harnett et al., 2005). These results confirmed a study by Yates, Gerralda and Higginson (1999) that assessed the association between the PCS and the HoNOSCA and found similar correlations.

Evidence of concurrent validity was demonstrated by finding that the mean number of critical incidents that patients were involved in per month was positively associated with the intake HoNOSCA score ($r = 0.34$, $p < .05$). At the individual item level, there was a significant positive correlation between the number of incidents and disruptive/aggressive behaviour ($r = 0.28$, $p < .05$), non-accidental self-injury ($r = 0.43$, $p <.01$), and drug and alcohol difficulties ($r = 0.28$, $p < .05$). According to Harnett et al. (2005), further evidence of concurrent validity was shown through a positive association between changes in HoNOSCA scores over the course of admission and clinicians' retrospective reports of change. Specifically, mean ratings of patients' global change between intake and discharge or between intake and the time of the study for participants who had not been discharged, was ($m = 5.12$, $sd = 0.82$). The mean change in HoNOSCA scores within the subsample of patients' clinicians rated as having improved was 1.96 at 3 months and 3.40 at 6 months, while patients considered not to have changed had HoNOSCA change scores of 0.76 at 3 months and -0.30 at 6 months. These results indicate that the HoNOSCA was found to be sensitive to change in severity of problems over time.

The HoNOSCA has been used to investigate the relationship between demographic variables and the nature of inpatient treatment episodes and found interesting results. Harnett et al. (2005) examined the association between HoNOSCA scores and age, gender and length of treatment in an inpatient setting. They similarly hypothesised that HoNOSCA scores would decrease over the period of admission. They found that individual items on the HoNOSCA rather than the total score were more useful in evaluating the impact of inpatient psychiatric treatment. The HoNOSCA demonstrated that older patients showed greater improvement over the course of their admission, especially in psychotic symptomatology, family life and relationships and disruptive aggressive behaviour. The research explored gender differences and found no gender difference in the total HoNOSCA score at intake, although boys showed greater levels of disruptive/aggressive behaviour and scholastic/language problems than girls. Within an inpatient setting, the authors stated that there was a lack of difference in total HoNOSCA score at intake. However, they found that boys showed more rapid improvement in global functioning than girls. Furthermore, there were no gender differences in the degree of change for adolescents who stayed six months or more. Although HoNOSCA scores at intake were not predictive of eventual length of stay in the unit, adolescents who stayed in the unit longer showed less improvement than those who stayed for a relatively short term admission. These results suggest the HoNOSCA has been a useful research tool for investigating wider issues related to the mental health of children and adolescents.

As yet, only a small number of studies have examined the construct validity of the HoNOSCA and the internal consistency of the scale. For example, Gowers et al. (2000) investigated the factor structure of the HoNOSCA. A Principle Components Analysis was conducted on the 13 HoNOSCA items that revealed a factor structure was close to that of the key four subscale component sections of the HoNOS; that is, firstly the behaviour subscale

(disruptive behaviours; over-activity; self-harm; substance misuse), the impairment subscale (learning difficulties; physical illness), the symptom subscale (abnormal beliefs; non-organic symptoms; emotional symptoms) and the social deficits subscale (peer relationship difficulties; excessive dependency; family difficulties; school nonattendance), together with an overall score. Later studies have not been as supportive of the structure.

The more recent HoNOSCA study by Harnett et al. (2005) touched on the internal structure of the HoNOSCA during their investigation into the validity and reliability of the HoNOSCA. Harnett et al. (2005) found low intercorrelations between HoNOSCA subscale items that suggested the HoNOSCA should not be considered a unidimensional scale. The scale also showed poor internal consistency (Cronbach's alpha = 0.45) of the four subscales. These results suggested only the total of all 13 HoNOSCA scores and individual item scores were appropriate for measurement or use in subsequent analyses. Considering that debate over the HoNOS factor structure continues, the HoNOSCA factor structure clearly requires further investigation.

Harnett et al. (2005) examined the internal structure of the HoNOSCA during its development, considering both individual items and subscales. They considered the correlations between the individual items and found them to be low, which they took as evidence that each item carried independent weight. They then examined the factor structure of the HoNOSCA and found that it generally mirrored the instruments subscales. Brann et al. (2001) by contrast also examined the factor structure of the HoNOSCA and produced preliminary evidence for a different set of factors. Although the results found by Gowers et al. (2000) and Brann et al. (2001) were inconsistent with each other regarding the factor structure, neither found support for the instrument's subscales.

Gowers et al. also considered the extent to which the HoNOSCA total score accurately reflected clinical severity arguing that high total scores should more frequently be

associated with high scores on a few items than on mild to moderate scores on a number of items. They found that the total score increased as a linear function of high individual item scores, a finding confirmed by Brann et al. (2001) in a subsequent study.

The research conducted by Harnett et al. (2005) revealed that while the total HoNOSCA scores may be a useful indicator of global functioning, individual items rather than subscales appear to be better indicators of functioning in specific domains. Individual items rather than the total HoNOSCA score revealed important age, gender and length of stay differences. Similarly, while the total HoNOSCA scores were sensitive to change, the total HoNOSCA score obscured important changes across gender, age and length of stay in specific domains of functioning over the course of admission.

Harnett et al. (2005) presented some limitations in the use of the HoNOSCA as a predictive tool in measuring clinical outcomes. The presenting problems for the adolescents in this inpatient sample included predominantly psychotic symptoms and self-harming behaviour that justified ongoing management to contain these symptoms. Outcome evaluations using the HoNOSCA need to acknowledge that simply comparing the pre- and post-intervention differences will obscure the important contribution of a service in stabilizing the functioning of these individuals. Furthermore, the variability in scores over time means post-intervention measures for long-term patients cannot be taken as a reliable measure of functioning, limiting the usefulness of the HoNOSCA as an outcome measure for individuals displaying psychotic and self-harming behaviour. Methodological issues also should be highlighted from this study. The sample size of 51 adolescents over the six-month period was small and the HoNOSCA was not compared with other outcome measures currently used in adolescent settings such as the CGAS (Children's Global Assessment Scale) or the SDQ (Strengths and Difficulties Questionnaire).

Studies thus far concentrating on the reliability and validity of the HoNOSCA have yielded mixed results overseas and in Australia suggesting that further investigation into the validity of the instrument is required. In addition, no studies provide evidence that the HoNOSCA had been standardized with Australian norms. Furthermore, no published HoNOSCA studies have been found to have explored any particular diagnostic category. The importance of the HoNOSCA and evidence that further investigation into the validity of the HoNOSCA is warranted provided the rational for this thesis.

Aims and Hypotheses

The initial aim of this study was to further explore the construct validity of the HoNOSCA in order to expand the body of research that has been rapidly expanding in recent years. As described in the literature review, investigations regarding the HoNOSCA have included a range of validity tests and reliability testing. However, due to inconsistent findings there remains some doubt as to the stability of the factor structure and the reliability of the subsequent subscales. It was therefore hypothesised that the original four-factor structure of the HoNOSCA would be confirmed through testing the internal structure of the HoNOSCA.

The second aim of this study was to investigate whether various categories of disorder demonstrated different problem severity profiles on HoNOSCA items. It is highly likely that these item profiles will give some indication whether the HoNOSCA can differentiate between disorder categories. It was therefore hypothesised that different disorder categories will have markedly different HoNOSCA item severity profiles between various ICD-10 (International Classification of Diagnoses, 10th Edition) diagnostic categories. In the same vein, the third aim of this study was derived from the previous face validity study where clinicians stated that the HoNOSCA item elevations logically linked to characteristic features of particular disorders. It was therefore hypothesised that HoNOSCA item elevation scores

could discriminate between different diagnostic categories and if not, could discriminate between internalization and externalization disorders.

The lack of previous literature referring to standardization of the HoNOSCA suggested that standardization of the scale would expand the current body of HoNOSCA research and assist with the interpretability of the HoNOSCA items. For example, clinicians are currently able to observe a graphical representation of HoNOSCA scores for any given consumer in raw scores. The ability to interpret standardized scores could provide clinicians with meaningful interpretation of, and comparison between, the HoNOSCA item elevations. Therefore, a pilot study following the process of scale standardization was the final aim of this study.

Method

Data Collection Process

All Queensland Child and Youth Mental Health Services (CYMHS) were required to collect Outcomes Information System (OIS) data. Consequently, all Toowoomba CYMHS clinicians contributed to data collection as part of case management responsibility. The researcher, who was a CYMHS team member throughout the duration of the initial stages of this research, contributed at least twenty-five percent of the recorded data.

OIS data were collected at a local level to inform management about service trends, inform the government monitoring of service provision for funding allocation, and was intended to inform clinicians about trends in the number of service episodes and lengths of service provision. The CYMHS OIS data system required clinicians to enter demographic and diagnostic information including ICD-10 primary and secondary diagnoses, HoNOSCA scores, Strengths and Difficulties Questionnaire (SDQ) scores, Factors Influencing Health Status (FIHS) scores and the Children's Global Assessment Scale (CGAS) scores for every client at the points of initial assessment, review and discharge. This research did not use all

available OIS data as investigation into the interrelationship between the HoNOSCA, SDQ, FIHS and CGAS scales was considered beyond the scope of this study. As this research focused primarily upon the properties of the HoNOSCA, only demographic information and HoNOSCA raw scores were selected for analysis.

Data Screening

Outcome Information System (OIS) data between dates of 17 April 2003 to 16 February 2007 from the Toowoomba CYMHS were made available for analysis. Out of 1399 available cases, a community sample of 300 cases was randomly selected prior to analysis. Out of this random selection of cases, 55 cases were removed from the analysis as they contained missing essential data or obvious administrative errors.

Participants

A total number of 245 sets of valid demographic and HoNOSCA pre-treatment assessment item scores were included in this analysis. The data from children and adolescents between the ages of 12 months and 18 years of age were used. All participant data were collected from those living in the Toowoomba and Darling Downs region at the time of presentation to the service. Children, young people or their families were not interviewed for this research as the data were already collected by the service. Data included each subject's age, gender, primary and secondary diagnoses, date of service episode commencement and initial start-of-episode HoNOSCA scores.

Procedure

Ministerial approval was granted for this research project (Appendix A). In addition, this research was approved by the University of Southern Queensland Ethics Committee. Then data was gained from the Mental Health Information Manager who was responsible for the electronic collation, storage and reporting on the data. Clients were not approached directly by the researcher. The researcher did not view any charts or access any personal

identifying information. The database information was downloaded in an unidentified form and no identifiable demographics (names, guardians, addresses) were provided to the researcher. An automatically generated corresponding number was be given to each data set so that demographic and HoNOSCA data could be linked between data sets.

Archived data were used in this study because it was in keeping with the procedures selected by National Mental Health Outcomes and Casemix Collection (2003) which boasted that the retrospective analysis of such data would be helpful in routine clinical practice by allowing the monitoring of the health and wellbeing of consumers. Furthermore, the measures were intended to be suitable for monitoring outcomes at the broader service level regarding determinants of case mix concepts which aimed to improve the quality of information available to guide decisions at all levels of the health system.

Data sets were provided in Windows Excel database form. Data sets were linked by matching identification numbers and dates so that for each individual, some demographic information (gender and age), length of service episode information and HoNOSCA raw scores could be analysed accordingly. Age at first presentation and lengths of service episodes were calculated using Excel functions. The excel information was transferred into SPSS analysis form and variables were labelled prior to analysis.

Inter-rater reliability was maximized during this study though two processes as recommended by the previous research. The staff within this CYMHS team had been provided with standardized training in the use of the HoNOSCA and the other OIS scales. At regular intervals, staff were required to attend ‘refresher’ training. In addition, all staff were required to present the initial assessments, reviews and discharges at a weekly case conference. During case conference, the HoNOSCA scale was presented electronically so that the entire multidisciplinary team could observe the HoNOSCA ratings completed by each clinician while assessment or discharge was reported to the team. If members of the

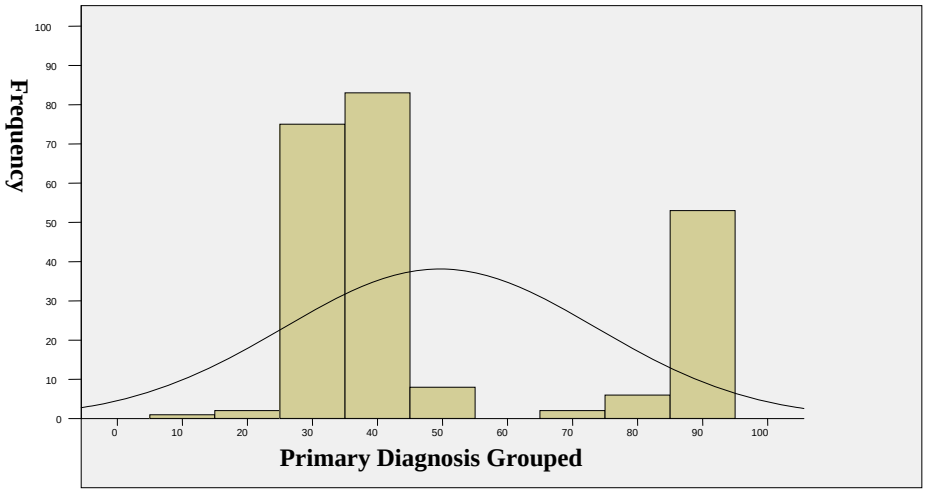
team did not agree with the subscale scores given by the clinician, scores were changed at case conference to reflect a more accurate measure of severity for the assessment thus preserving inter-rater reliability of the measure.

Contextual Results

In order to describe the nature of clients treated by Toowoomba CYMHS, frequency and chi-square analyses were performed on the 245 sets of data describing demographics and diagnostics. These results describe the population within which the construct validity investigations occurred and the population upon which norms were created.

Diagnoses

The results indicated that internalization disorders (neurotic and stress-related disorders and mood disorders) were the most frequently diagnosed disorders in this sample population. The next most frequently presenting diagnostic category treated by the CYMHS team was behavioural and emotional disorders with onset usually occurring in childhood and adolescence as depicted in Figure 3.0.



10 = F10-19 Disorder due to psychoactive substance, 20 = F20-29 Schizophrenia, schizotypal and delusional disorders, 30 = F30-39 Mood disorders, 40 = F40-49 Neurotic and stress related disorders, 50 = F50-59 Behavioural syndromes assoc, with physiological disturbance, 70 = F70-79 Mental Retardation, 80 = F80-89 Developmental disorders, 90 = F90-98 Behavioural disorders with onset in childhood or adolescence.

Figure 3.0 Number of Cases Per Diagnostic Category.

Gender

Frequency analysis found that more females than males presented with internalization disorders including neurotic, stress-related (anxiety disorders) and somatoform disorders and mood disorders. The most frequent category, neurotic and stress related disorders included phobic anxiety disorders, obsessive-compulsive disorder, reaction to severe stress, post-traumatic stress disorder and adjustment disorders, other anxiety disorders, dissociative (conversion) disorders and somatoform disorders. The second category of mood disorders included bipolar affective disorders, episodic depression, recurrent depressive disorder, persistent mood (affective) disorders and unspecified mood (affective) disorders. More males presented to the service with externalization disorders including behavioural disorders including hyperkinetic disorder, conduct disorder, mixed disorder of conduct and emotions, emotional disorders with onset specific to childhood, disorder of social function with onset specific to childhood and adolescence and tic disorder. Table 3.1 provides more detailed information regarding the percentages of the sample population and the mean age of consumers in each diagnostic category.

Table 3.1

Percentages of Children and Adolescents Per Primary Diagnosis Category, Gender Percentage and Mean Age Within ICD-10 Primary Diagnosis Categories

Diagnostic Category	Percentage of Sample Population	Percentage Males (*n* = 116)	Percentage Females (*n* = 129)	Mean Age
F10 - 19 Mental and behavioural disorders due to psychoactive substance use	0.4%	4%	.0%	16.9
F20 – 29 Schizophrenia, schizotypal and delusional disorders	0.9%	9%	.0%	16.7
F30 – 39 Mood (affective) disorders	32.6%	6.5%	26.1%	14.9
F40 – 49 Neurotic, stress-related (anxiety disorders) and somatoform disorders	36.1%	16.5%	19.6%	13.7
F50 – 59 Behavioural syndromes associated with physiological disturbances and physical factors	3.5%	1.3%	2.2%	15.3
F70 – 79 Mental retardation	0.9%	.0%	0.9%	15.9
F80 – 89 Disorders of psychological development	2.6%	2.6%	.0%	11.6
F90 -98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	23.0%	18.3%	4.8%	11.4

Chi-square crosstabulation results indicate the gender difference in these diagnostic categories was statistically significant ($\chi^2 = 56.362$, $df = 7$, <.001) as shown in Table 3.2. These results indicated that significant gender differences occurred between diagnoses.

Table 3.2

Crosstabulation of Gender and Diagnostic Category

Gender	Diagnostic Categories								Total
	F10-19	F20-29	F30-39	F40-49	F50-59	F70-79	F80-89	F90-99	
Male	1	2	15	38	3	0	6	42	107
Female	0	0	60	45	5	2	0	11	123

Age

More adolescents aged 12 years and older presented to the service compared to younger children. The age range within this sample population included children from the age of four through to 18 years of age. This may be a reflection of the HoNOSCA data recording limits that only accepted data entry of children older than three years of age. The overall mean age of those children and adolescents attending the service was 13.5 indicating that a large portion of CYMHS consumers were adolescents. Table 3.1 shows the mean age of children and adolescents within each diagnostic category.

The age differences between diagnostic categories were statistically significant. Crosstabulation results indicate significant age differences between diagnostic categories ($\chi^2 = 263.87$, $df = 136$, $r < .005$). Children 11 years of age and younger were more likely to be diagnosed with F80-89 (disorders of psychological development) and F90-99 (behavioural and emotional disorders with onset usually occurring in childhood and adolescence) as compared to adolescents 12 years of age and older. Those in adolescence were frequently diagnosed with anxiety and mood disorders, psychotic disorders, behavioural syndromes associated with physiological disturbances and physical factors and disorders due to substance abuse.

Primary Diagnoses

The primary diagnoses most frequently treated at Toowoomba CYMHS were anxiety disorders, affective disorders (depressive disorders) and behavioural disorders. Of all those with a primary anxiety disorder diagnosis, many were diagnosed with depression. Likewise, of all those with a primary diagnosis of depression, many had a comorbid anxiety disorder.

Length of Service Episodes

Length of service episode represents the length of time the case is considered active or open. A gender difference existed in regards to length of service episodes. The mean length of service episodes was compared between males and females. Males open service episode for a mean number of 311.65 days and females attended the service for a mean number of 266.54 days. A significant correlation of (r = -.30, p < .001) between age at first episode and total days with the service indicating that younger children tend to remain active clients of the service longer than older children or adolescents.

Diagnosis and Length of Service Episodes

The mean lengths of service episodes were calculated for each group of diagnoses and tabulated in Table 3.3. Results indicated the most frequently presenting disorders (anxiety and depression) have lower mean lengths of service episodes compared to some other disorders. This may have been because anxiety and depression were more amenable to treatment through the use of evidence-based therapy or amenable to natural change over time.

Table 3.3

Diagnosis and Mean Length of Service Episodes

Diagnostic Group	Mean Length of Episode (days)	*sd*
F10 – 19 Disorders due to substance use	161	202.32
F20 – 29 Schizophrenia, schizotypal and delusional disorders	115	121.97
F30 – 39 Mood (affective) disorders	244	214.25
F40 – 49 Neurotic, stress related (anxiety) disorders	248	233.57
F50 - 59 Behavioural syndromes associated with physiological disturbances	347	272.44
F60 – 69 Disorders of personality and behaviour	111	168.74
F70 – 79 Mental retardation	240	276.26
F80 – 89 Disorders of psychological development	416	435.79
F90 – 98 Behavioural and emotional disorders with onset in childhood	382	415.48

Disorders that have higher mean lengths of service episodes were the specific and pervasive developmental disorders, behavioural and emotional disorders with onset usually occurring on childhood and behavioural syndromes associated with physiological disturbance and physical factors in the F50 group, including eating disorders.

The strength of association between length of service episode and diagnosis was analysed further through the use of chi-squared crosstabulation analysis. No significant association was found between diagnosis and length of service episode ($\chi^2 = 22.88$, $df = 16$,

$p > .05$). Using a Peason Product Moment Analysis, a significant negative correlation was found between length of service episode and age ($r = -.204$, $p < .01$). This indicated that younger children had longer service episodes.

In summary, frequency and categorical analyses showed that more adolescents, especially females attended the service for the assessment and treatment of mood and affective disorders. Younger children, especially males attended the service for the assessment and treatment of behavioural and emotional disorders with onset usually during childhood. An association between diagnosis and lengths of service episode was not demonstrated from this analysis although younger children tended to require longer lengths of service episode. To further investigate the nature of particular diagnoses and associated problem severity, the distributional properties of the HoNOSCA items and subscales were investigated in more depth.

HoNOSCA Item Analysis Results

This research project used only outpatient or community data. The mean scores for each of the thirteen HoNOSCA items show few differences between the mean HoNOSCA scores as compared with the outpatient mean scores collected by Brann et al. (2000). These mean item scores are displayed in the Table 3.4.

Table 3.4

Comparison of Mean Item Scores of Inpatient and Outpatient Samples in Research

	Mean item scores		
Items	Outpatient sample (n=113) (Brann et al. (2000)	Inpatient sample (n=50) (Harnett et al. (2005)	Current outpatient sample (n= 245)
1.Disruptive/aggressive behaviour	1.60	1.40	1.33
2.Overactivity and attentional difficulties	.85	1.42	1.44
3.Non accidental self-injury	.78	.64	.90
4.Alcohol, substance/solvent misuse	.67	.20	.25
5.Scholastic/language difficulties	1.30	1.10	.90
6.Physical illness/disability	.45	.64	.30
7.Hallucinations/delusions	.52	.86	.35
8.Non-organic somatic problems	.50	.48	.97
9.Emotional and related difficulties	2.29	2.20	2.60
10.Peer relationship difficulties	1.75	2.15	1.64
11.Self-care and independence problems	.50	1.36	.47
12.Family life and relationship problems	2.30	2.70	2.18
13.Poor school attendance	1.40	.66	.82

Some mean HoNOSCA scores were considered higher, therefore more severe than inpatient mean scores collected by Harnett et al. (2005). For example, the mean HoNOSCA scores in this study suggest that children and adolescents treated by this service have more severe problems with overactivity and attentional difficulties and non-organic somatic difficulties than both the previously recorded inpatient and outpatient samples.

Some problems are considered more severe than others in all three of these samples.

These results suggest that the most clinically significant problems children and adolescents encounter are problems with family life and relationships, closely followed by problems with peer relationships. In addition, the profiles generated in this study confirm this finding by demonstrating that problems with family life and relationships are featured across almost all disorder categories.

The Factor Structure of the HoNOSCA

Another aim in this research was to test the hypothesis that the original four-factor structure of the HoNOSCA, consisting of the 'Behavioural', 'Impairment', 'Symptoms' and 'Social' subscales could be replicated. The sample size in this study provided sufficient power to explore the underlying factor structure through a series of Factor Analyses.

Prior to testing the factor structure of the HoNOSCA, item scores were checked for skewness and kurtosis results indicating that scores on ten items were normally distributed. However, three HoNOSCA items were positively skewed indicating high frequency of '0' scores on HoNOSCA items including Item 4 'Problems with alcohol, substance or solvent use', Item 6 'Problems with physical illness or disability', Item 7 'Problems with hallucinations, delusions or abnormal perceptions' and Item 11 'Problems with self-care and independence'. These data were not transformed or altered in any way as they reflected legitimate ratings on these items.

Each of the four original reported subscales was examined by testing the reliability of each subscale in turn. Subscale A 'Behaviour' containing items 1, 2, 3 and 4 demonstrated low reliability (Cronbach's alpha = .42). Subscale B 'Impairment' containing items 5 and 6 demonstrated low reliability (Cronbach's alpha = .34), Subscale C 'Symptoms' containing Items 7, 8 and 9 demonstrated low reliability (Cronbach's alpha = .51), and Subscale D 'Social' containing items 10,11 and 12 also demonstrated low reliability (Cronbach's alpha = .40). However, when combining the four subscales, the overall reliability of the HoNOSCA

scale was found to be adequate (Cronbach alpha = .70). These initial results suggested that the original four subscales are unreliable in this study.

An attempt was made to replicate the original four subscale factors. A Principle Components Analysis (PCA) was performed controlling for the extraction of four factors with eigenvalues over 1. Factor loadings below .4 are not reported. The results are displayed in Table 3.5.

Table 3.5

Principle Components Analysis Controlling for Extraction of Four Factors

Factor Items	Factor 1	Factor 2	Factor 3	Factor 4
H2. Problems with overactivity	.719			
H5. Problems with scholastic	.692			
H1. Problems with behaviour	.661			
H12. Problems with family life	.564			
H10. Problems with peer relationships	.557			
H11. Problems with self care	.491			
H3. Non-accidental self injury		.605		
H7. Problems with hallucination		.520	.494	
H8. Problems with somatic symptoms	.421	.456		
H4. Alcohol, substance solvent misuse		.414		.401
H6. Physical illness or disability			.551	
H13. Poor school attendance				.668
H9. Emotional and related symptoms		.470		-.595
Eigenvalues	2.991	1.659	1.197	1.105

Extraction Method: Principle Components Analysis

The PCA extracted four factors that accounted for 53.48% of variance. Another PCA with Varimax with Kaiser Normalization was performed in another attempt to extract the original four factors. Controlling for 4 factors, the Varimax with Kaiser Normalization rotation extracted the following factors accounting for 53.5% of variance but not the original four factors. The four factors that did emerge from the PCA using Varimax Rotation are shown in Table 3.6.

Table 3.6

Factor Loadings for the Principle Components Analysis Using Varimax Rotation

Factor Items	Factor 1	Factor 2	Factor 3	Factor 4
H10. Problems with peer relationships	.687			
H1. Problems with behaviour	.684			
H12. Problems with family life	.650			
H5. Problems with scholastic	.608		.454	
H2. Problems with overactivity	.569		.441	
H7. Problems with hallucination		.793		
H4. Alcohol, substance solvent misuse		.614		
H8. Problems with somatic symptoms		.589		
H3. Non-accidental self injury		.555		
H6. Physical illness or disability			.732	
H11. Problems with self care			.544	
H9. Emotional and related symptoms				.731
H13. Poor school attendance				-.622

Note: Rotation method: Varimax with Kaiser Normalization. Cross loadings < .40 are omitted.
Note: Reliability coefficients F1 = .73, F2 = .50, F3 = .36, F4 = .11.

The results of the rotated components analysis controlling for four factors did not extract the originally proposed factor model as hypothesised. Similarly, the four factor model

could not be replicated through the use of alternate rotation techniques such as Varimax with Kaiser Normalization. Upon inspection of the items that loaded on each factor it was not possible to meaningfully interpret the factors.

After removing the constraints of the 4 factor structure, another PCA and Varimax Rotation with Kaiser Normalization was performed. Five clearly identifiable factors with a Chronbach's alpha of .728 emerged accounting for 61% of variance. The five factors and any associated cross loadings were examined to determine factor complexity. Only items with a value of .5 and above were included and items with cross loading of .4 and below were ignored. The results of the principle components analysis are shown in Table 3.7.

Factor 1 accounted for 19.14% of variance with reliability of .73. Factor 1 contained Item 1 'Problems with behaviour', Item 2 'Problems with overactivity', Item 5 Problems with scholastic skills', Item 10 'Problems with peer relationships' and Item 12 'Problems with family life and relationships'. Items regarding behavioural disturbance and overactivity may be linked and items regarding peer and family relationships may be but the five items do not appear to nest together with one's ability to perform at school or with each other in a clear manner.

Factor 2 accounted for 11.15% of variance with reliability of .52. Factor 2 consisted of Items 7 'Problems with hallucinations' and Item 8 'Delusions and somatic problems' respectively. Both of these items are within the same subscale of the original HoNOSCA which indicates that both of these problems may be considered symptoms of disorder. However, Item 9 'Emotional and related symptoms', did not load on this factor as expected.

Factor 3 accounted for 10.15% of variance with reliability of .33. Factor 3 consisted of Items 3 and 4 which were problems with both non accidental self-injury (usually by self-mutilation or drug overdose) and problems with alcohol, substance or solvent misuse. These two items were included within the original behaviour HoNOSCA subscale and may be

considered to have logical links in that both of these problems may be considered forms of self-injury or risk-taking behaviour.

Table 3.7

Five-factor Loadings for the Principle Components Analysis with Varimax Rotation and Kaiser Normalization

Factor Items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
H1. Problems with behaviour	.700				
H10. Problems with peer relationships	.685				
H5. Problems with scholastic	.667				
H2. Problems with overactivity	.608				
H12. Problems with family life	.595				
H8. Problems with somatic symptoms		.854			
H7. Problems with hallucination		.640			
H4. Alcohol, substance solvent misuse			.790		
H3. Non-accidental self-injury			.670		
H6. Physical illness or disability				.744	
H11. Problems with self-care				.577	
H9. Emotional and related symptoms					.758
H13. Poor school attendance					-.586

Note: Reliability coefficients F1 = .73, F2 = .52, F3 = .33, F4 = .36, F5 = -.11.

Factor 4 accounted for 10.85% of variance with reliability of .36. Factor 4 contained Items 6 and 11, 'Problems with physical illness or disability' and 'Problems with self care'. These items were not within the same factors or subscales in the original HoNOSCA factor structure. Logical linkages between these items may be considered weak except that both possibly relate to physical impairment, and disability may cause one difficulty in managing activities of daily living. Such items were also considered to be within different factors in the new HoNOS structure proposed by Eager et al. (2005).

Factor 5 accounted for 9.11% of variance with reliability of -.11. Factor 5 consisted of Items 9 and 13, 'Problems with emotional and related symptoms' and 'Poor school attendance'. Item 9 was expected to load with other symptom items within Factor 2 as previously mentioned and it does not appear to have a logical link with problems with school attendance.

In summary, the results of this analysis cannot confirm the original four-factor structure as hypothesised. This suggests that the four factors or 'subscales' as they are referred to, may not be interpreted as a valid reduction. It was proposed that instead total scores or individual item scores be used. Alternatively, a five-factor structure was found without complexity. However, the items within each of the five factors that emerged were not readily interpretable and have unacceptably low reliability. In the analysis that follows subscale scores are consequently not used.

Problem Severity Profiles of Disorders

To test the hypotheses that HoNOSCA scores can differentiate between various categories of disorders a number of analyses were performed. To commence, frequency analysis was performed to determine the mean raw scores for each of the thirteen items. The results as shown in Table 3.8 indicate variation between the mean raw scores on items across all diagnoses. The two items with the highest mean raw scores were firstly Item 9 'Problems

with emotional and related symptoms', and secondly Item 12 'Problems with family life and relationships'. Scores of two and above indicate problems of clinical significance indicating mild, moderate or high severity according to the clinicians scoring handbook.

Table 3.8

Mean HoNOSCA Item Scores

HoNOSCA Item	Mean	Standard Deviation	Std. Error Mean
1. Disruptive, antisocial or aggressive behaviour	1.33	1.31	.084
2. Problems with over-activity, attention or concentration	1.44	1.11	.071
3. Non-accidental self-injury	.90	1.22	.079
4. Alcohol, substance or solvent misuse	.25	.67	.043
5. Problems with scholastic or language skills	.90	1.14	.073
6. Physical illness or disability problems	.30	.79	.051
7. Problems with hallucinations, delusions or abnormal perception	.35	.76	.049
8. Problems with non-organic somatic symptoms	.97	1.13	.072
9. Problems with emotional and related symptoms	2.60	.72	.046
10. Problems with peer relationships	1.64	1.12	.072
11. Problems with self care and independence	.47	.91	.059
12. Problems with family life and relationships	2.18	1.15	.074
13. Poor school attendance	.82	1.23	.079

HoNOSCA Item Elevation Patterns

All children and adolescents are given a diagnosis as a result of clinical assessment and this is confirmed by the child and adolescent psychiatrist through the case conference process. At the time of assessment, start-of-episode HoNOSCA scores are also collected. The mean start-of-episode HoNOSCA item scores were then analysed for each diagnostic category relevant to the child and adolescent population (e.g. F40-49 Anxiety disorders,

F80-89 Disorders of psychological development). Providing visual patterns may assist in understanding the unique patterns of problem severity experienced by those who had been diagnosed with different disorders. Those diagnostic categories with 50 or more subjects were depicted in the following graphs. Each mean score was rounded to the whole number for ease of visual interpretation.

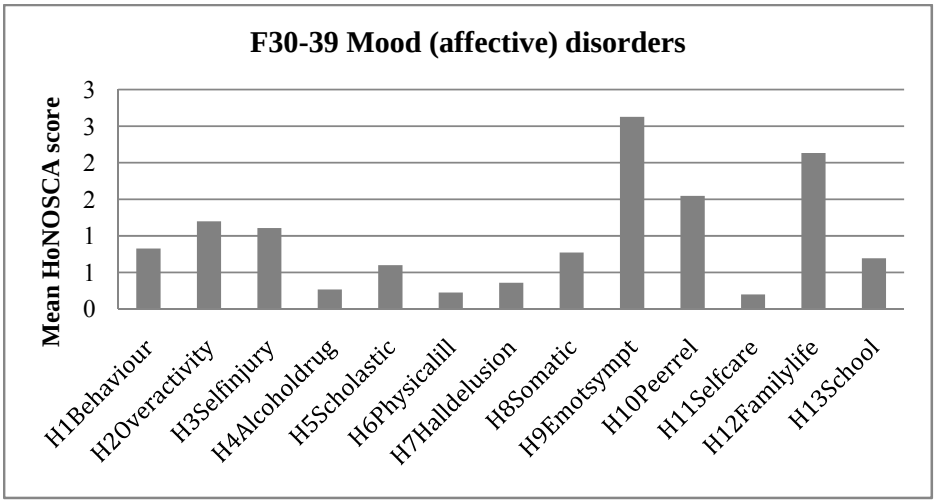


Figure 3.1 HoNOSCA item elevation pattern for diagnostic category F30-39 mood disorders (n=75).

A very similar severity pattern exists between mood disorders and neurotic and stress related disorders (Figure 3.2). This pattern may indicate a similarity between the nature of a mood disorder and a neurotic and stress-related disorder.

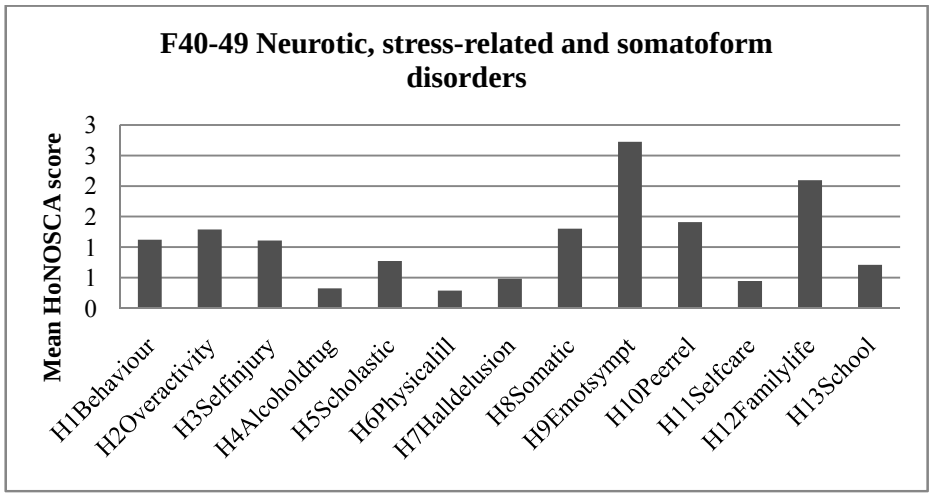


Figure 3.2 HoNOSCA item elevation pattern for diagnostic category F40-49 neurotic, stress related and somatoform disorders (n=83).

The mean HoNOSCA item elevations for the category of behavioural and emotional disorders with onset in childhood and adolescence are shown in Figure 3.3. This category includes disorders such as hyperkinetic disorders, conduct disorder and oppositional defiant disorder, mixed disorders of conduct and emotions, separation and phobic anxiety disorders of childhood and disorders such as attachment disorders, elective mutism, tick disorders, enuresis and encopresis and pica of infancy and childhood. As expected these children experience significant problems with behaviour and these problems were considered clinically significant and rated as being mild to moderate in severity. Similar to the categories of mood and anxiety disorders, mean item scores for emotional and related symptoms and problems with family life and relationships were clinically significant and rated as being mild to moderate in severity.

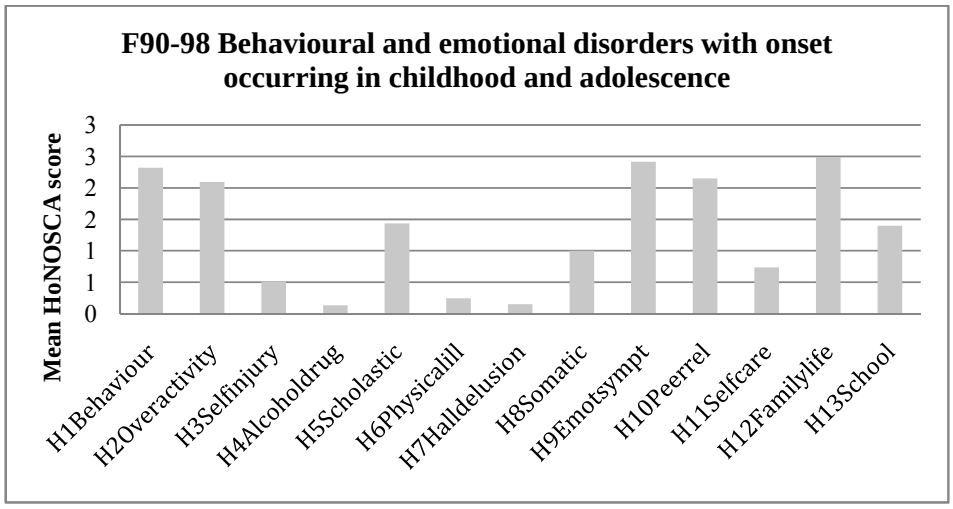


Figure 3.3 HoNOSCA item elevation pattern for diagnostic category F90-98 behavioural and emotional disorders with onset in childhood and adolescence (n=53).

The hypothesis that different item profiles would be observed across disorders was only partially supported by analysis on this data sample. Mood and anxiety disorders showed similar profiles and similar item severity. Behavioural and emotional disorders with onset during childhood and adolescence were observed to differ from mood and anxiety disorders.

Discriminant Functional Analysis

The pattern of HoNOSCA item elevations in each diagnostic category suggests that particular disorders can show unique elevation patterns. As the results suggested, anxiety and mood disorders appear to have very similar elevation patterns that differ from other diagnostic categories such as the category of behavioural disorders with onset in childhood. To test the hypothesis that the HoNOSCA can be used to discriminate between diagnostic categories, internalization (mood and anxiety) and externalization (behavioural) disorders were selected for analysis.

Internalization and externalization disorder categories were selected for several reasons. These disorders most frequently presented to the Service so these diagnostic categories had sufficient numbers of cases for analysis. Internalization disorders include the

ICD-10 categories of F30-39 mood disorders and the F40-49 anxiety disorders while externalization disorders include the F90-99 category of disorder which include behavioural disorders such as hyperkinetic and conduct disorders. A series of Discriminant Function Analyses were conducted. The first Discriminant Function Analysis as outlined in Table 3.9 was performed to test the hypothesis that the HoNOSCA can discriminate between mood, anxiety and behavioural disorders.

*Table 3.*9

Discriminant Function Analysis of Scores on Mood, Anxiety and Behavioural Disorder Variables

Predictor Variable	Univariate *F*	Function Coefficients 1	2
H1. Problems with behaviour	27.22	.63	.32
H2. Problems with overactivity	14.41	.41	-.35
H3. Non-accidental self-injury	7.10	-.27	-.01
H4. Alcohol, substance solvent misuse	.61	-.19	.07
H5. Problems with scholastic	11.56	-.01	.24
H6. Physical illness or disability	.08	-.29	.07
H7. Problems with hallucination	1.77	-.29	-.01
H8. Problems with somatic symptoms	5.54	-.02	.73
H9. Emotional and related symptoms	1.55	-.37	.09
H10. Problems with peer relationships	9.44	.15	-.47
H11. Problems with self-care	4.47	.20	.41
H12. Problems with family life	2.84	.01	-.21
H13. Poor school attendance	9.56	.30	.04

Canonical R	1=.626
	2=.268
Eigenvalues	1=.643
	2=.077
Significance	1=.000
	2= .238

Actual Group	Predicted Group Membership						Total
	Mood Disorders		Anxiety Disorders		Behavioural Disorders		211
	n	%	n	%	n	%	n
Mood Disorders	45	60.0	18	24.0	12	16.0	75
Anxiety Disorders	31	37.3	37	44.6	15	18.1	83
Behavioural Disorders	5	9.4	8	15.1	40	75.7	53

The classification was evaluated by testing the significance between the lambdas. Wilks' Lambda 1 through 2 was ($F = .565$, $p < .001$) and Wilks' Lambda 2 was ($F = .928$, $p > .05$). The results showed that significant discrimination was found between mood and anxiety but not between these and behavioural disorders on HoNOSCA item scores.

The second Discriminant Function Analysis was performed to tease out the discrimination between the three categories of disorders; to test whether the HoNOSCA items can discriminate between the internalization disorders categories of mood and anxiety disorders as shown in Table 3.10. Results showed 57.6 % of the original grouped cases were correctly classified.

Table 3.10

Discriminant Function Analysis of Scores on Mood and Anxiety Disorder Variables

Predictor Variable	Function
H1. Problems with behaviour	.209
H2. Problems with overactivity	-.363
H3. Non-accidental self-injury	-.019
H4. Alcohol, substance solvent misuse	.023
H5. Problems with scholastic	.290
H6. Physical illness or disability	.020
H7. Problems with hallucination	-.063
H8. Problems with somatic symptoms	.756
H9. Emotional and related symptoms	.143
H10. Problems with peer relationships	-.384
H11. Problems with self-care	.490
H12. Problems with family life	-.208
H13. Poor school attendance	-.134

Canonical R .312

Eigenvalues .108

Significance .287

Actual Group	Predicted Group Membership				Total
	Mood Disorders		Anxiety Disorders		158
	n	%	n	%	
Mood Disorders	47	62.7	28	37.3	75
Anxiety Disorders	39	47.0	44	53.0	83

The classification was evaluated by testing the significance between the lambdas (F = .902, $p > .05$). The results showed that no significant discrimination was found between mood and anxiety disorders on HoNOSCA item scores. This result was expected due to the fact that both mood and anxiety disorders are considered to be internalization disorders.

The third Discriminant Function Analysis was performed to test whether the HoNOSCA items can discriminate between anxiety disorders and behavioural disorders. A loading matrix of correlations between the discriminant functions and predictor variables is shown in Table 3.11.

The results show that 80.9% of original grouped cases were correctly classified. The classification was evaluated by testing the significance between the lambdas (F = .557, $p <$ .001). The results showed that significant discrimination was found between anxiety disorders and behavioural disorders as measured by HoNOSCA items. This result was expected given that anxiety disorders are considered to be internalization disorders and behavioural disorders are considered to be externalization disorders.

Table 3.11

Discriminant Function Analysis of Scores on Anxiety and Behavioural Disorder Variables

Predictor Variable	Function
H1. Problems with behaviour	.553
H2. Problems with overactivity	.487
H3. Non-accidental self-injury	-.278
H4. Alcohol, substance solvent misuse	-.219
H5. Problems with scholastic	.035
H6. Physical illness or disability	-.371
H7. Problems with hallucination	-.343
H8. Problems with somatic symptoms	-.096
H9. Emotional and related symptoms	-.394
H10. Problems with peer relationships	.143
H11. Problems with self-care	.231
H12. Problems with family life	-.036
H13. Poor school attendance	.312
Canonical R	.666
Eigenvalues	.796
Significance	.000

Actual Group	Predicted Group Membership				Total
	Anxiety Disorders		Behavioural Disorders		138
	n	%	n	%	
Anxiety Disorders	67	80.7	16	19.3	83
Behavioural Disorders	10	18.9	43	81.1	53

The fourth Discriminant Function Analysis was performed to test whether the HoNOSCA items can discriminate between mood disorders and behavioural disorders. A loading matrix of correlations between the discriminant functions and predictor variables is shown in Table 3.12.

Table 3.12

Discriminant Function Analysis of Scores on Mood and Behavioural Disorder Variables

Predictor Variable	Univariate *F*	Function
H1. Problems with behaviour	54.49	.69
H2. Problems with overactivity	23.26	.27
H3. Non-accidental self-injury	7.74	-.27
H4. Alcohol, substance solvent misuse	1.66	-.18
H5. Problems with scholastic	18.26	-.00
H6. Physical illness or disability	.02	-.21
H7. Problems with hallucination	2.95	-.30
H8. Problems with somatic symptoms	1.46	.16
H9. Emotional and related symptoms	2.64	-.32
H10. Problems with peer relationships	9.97	.04
H11. Problems with self-care	11.91	.29
H12. Problems with family life	3.24	-.01
H13. Poor school attendance	9.64	.23
Canonical R	.678	
Eigenvalues	.852	
Significance	.000	

Actual Group	Predicted Group Membership				Total
	Mood Disorders		Behavioural Disorders		128
	n	%	n	%	
Mood Disorders	62	82.7	13	17.3	75
Behavioural Disorders	8	15.1	45	84.9	53

The results show that 83.6% of original grouped cases were correctly classified. The classification was evaluated by testing the significance between the lambdas ($F = .540$, $p < .001$). The results showed that significant discrimination was found between mood disorders and behavioural disorders as measured by HoNOSCA item scores.

The fifth Discriminant Function Analysis was performed to test whether the HoNOSCA items can discriminate between internalization disorders (both mood and anxiety disorders) and externalization disorders. Mood and anxiety disorders were re-coded into a new variable and selected for discriminant function analysis with behavioural disorders. A loading matrix of correlations between the discriminant functions and predictor variables is shown in Table 3.13.

Table 3.13

Discriminant Function Analysis of Scores on Internalization and Externalization Disorder Variables

Predictor Variable	Univariate *F*	Function
H1. Problems with behaviour	51.60	.62
H2. Problems with overactivity	25.47	.42
H3. Non-accidental self-injury	9.38	-.27
H4. Alcohol, substance solvent misuse	2.49	-.19
H5. Problems with scholastic	10.07	-.01
H6. Physical illness or disability	.02	-.29
H7. Problems with hallucination	5.01	-.29
H8. Problems with somatic symptoms	.08	-.04
H9. Emotional and related symptoms	5.31	-.37
H10. Problems with peer relationships	15.79	.17
H11. Problems with self-care	9.08	.19
H12. Problems with family life	4.68	.02
H13. Poor school attendance	12.56	.31

Canonical R .625

Eigenvalues .641

Significance .000

Actual Group	Predicted Group Membership				Total
	Internalization Disorders		Externalization Disorders		211
	n	%	n	%	
Internalization Disorders	129	81.6	29	18.4	158
Externalization Disorders	10	18.9	43	81.1	53

The results show that 81.5% of original grouped cases were correctly classified. The classification was evaluated by testing the significance between the lambdas (F = .641, $p <$ .001). The results showed that significant discrimination was found between internalization disorders and externalization disorders as measured by HoNOSCA item scores.

Tukeys Post Hoc testing was conducted on all three categories; mood, anxiety and behavioural disorders based on observed means to determine which HoNOSCA items contributed the most to discrimination between internalization and externalization disorders. Controlling for family-wise error from multiple comparisons, reliability was considered acceptable when less than .003 (the significance level of .05 divided by 13 items). The items that contributed significantly ($r <$ .003) to discrimination between internalization (mood and anxiety disorders) and externalization disorders (behavioural disorders) were Item 1 'Problems with behaviour', Item 2 'Problems with overactivity', Item 5 'Problems with scholastic skills', and Item 11 'Problems with self care'. All other items did not significantly contribute to discrimination.

Standardisation of the HoNOSCA

The lack of previous literature referring to standardization of the HoNOSCA led to the hypothesis that the derivation of standardized scores for the scale would expand the current body of HoNOSCA research and assist with the interpretability of the HoNOSCA items. For example, clinicians currently use raw scores or a graphical representation of HoNOSCA raw scores for any given consumer. The availability of standardized scores could provide clinicians with meaningful interpretation of, and comparison between, the HoNOSCA item elevations.

The development of a full set of standardized scores would require large groups of children at appropriate age intervals to complete the scale. Clearly this task is beyond the resources of this thesis, but the researcher believed that a small pilot study would be

persuasive showing just how clinically useful standardized tables might be. To assist with the interpretability of scores derived from the HoNOSCA, a table of normative values was established based on the 245 administrations of the scale. The normative scores which are shown in Table 3.14 are in standard score form with a mean of 50 and a standard deviation of 10. The equivalent normative score for the range of raw scores (0 – 4) is provided for each of the 13 HoNOSCA items. A test of skewness and kurtosis conducted on individual items showed that some items had positive skew indicating that most responses were very low on that item. De Vaus (2002) states that when two variables have very different distributions, it is difficult to compare their scores meaningfully. Thus Z-scores were calculated to express scores as the number of standard deviation units that a person's scores were from the mean of the variable. T-scores were then calculated for each level of severity (0, 1, 2, 3 and 4) to allow accurate interpretation of the scores. Table 3.14 shows the standardized scores (t-scores) for each item and total item scores, based on this sample of clinical participants.

This pilot study followed the standard process of scale standardization (de Vaus, 2002). However, the results of this study are based on the responses of a relatively small group of children presenting for treatment of diagnosable conditions. Therefore the table cannot be considered to be unrepresentative of all children and adolescents in the Toowoomba local area, throughout Queensland or in Australia.

Table 3.14

Pilot Normative Data for HoNOSCA Standardization

T score	Hon 1	Hon 2	Hon 3	Hon 4	Hon 5	Hon 6	Hon 7	Hon 8	Hon 9	Hon 10	Hon 11	Hon 12	Hon 13	Hon Total	T score
105				4											105
100															
97						4									97
91				3											91
90															
89											4				89
85							3								85
84						3									84
80															
78											3			32	78
77					4			4						31	77
76				2									4		76
75			4											30	75
74														29	74
73		4													73
72							2							28	72
71						2				4					71
70	4													27	70
69									4					26	69
68					3			3					3	25	68
67			3								2				67
66												4		24	66
65															65
64		3												23	64
63	3														63
62										3				22	62
61				1										21	61
60					2								2		60
59			2			1	1	2						20	59
58														19	58
57												3			57
56									3		1			18	56
55	2	2												17	55
54															54
53										2				16	53
52															52

T score	Hon 1	Hon 2	Hon 3	Hon 4	Hon 5	Hon 6	Hon 7	Hon 8	Hon 9	Hon 10	Hon 11	Hon 12	Hon 13	Hon Total	T score
51			1		1								1	15	51
50								1						14	50
49															49
48												2		13	48
47	1													12	47
46		1		0		0									46
45							0				0			11	45
44										1					44
43			0										0	10	43
42					0				2					9	42
41								0							41
40	0											1		8	40
39														7	39
37		0												6	37
36														5	36
35										0					35
34														4	34
33															33
32														3	32
31												0		2	31
30															30
29															29
28									1						28
14									0						14
<=13															<=13

Clearly, further research is necessary for the establishment of normative data and scale standardization. However, this pilot study, although small, supported the hypothesis that the development of Australian norms and standardization of the HoNOSCA could be informative for clinicians.

Discussion

The issues generated from the aims of this study will be discussed in turn. The aims of this study were to explore the factor structure of the HoNOSCA, devise problem severity

item profiles, determine whether the HoNOSCA can discriminate between diagnostic categories and to explore the development of a standardization table for the HoNOSCA.

In terms of contextual results, the results of Study 3 indicate that Toowoomba CYMHS team treat very few children under the age of four. An interesting gender pattern was discovered through this research showing that younger children of primary school age accounted for roughly 40% of the sample population. Out of these younger children aged twelve years and younger, more males presented to the service with a mental health disorder, mostly in regards to problems relating to conduct and hyperkinesis. These younger children also had longer service episodes than other adolescents. However, as children increased in age into adolescence (ages thirteen to eighteen) the trend changed demonstrating that more females presented with a mental health disorder. Similar to age and gender findings in the study by Brann et al (2001) and Harnett et al (2005), most of these females were diagnosed with an anxiety or affective disorder (internalization disorders) and required shorter service episodes than the younger boys who were more likely to be diagnosed with behavioural or externalization disorders. These results reflect the perceptions of clinical staff, support the hypothesis that more adolescents over the age of twelve were treated by the Service, and that more females were diagnosed with an internalization disorder.

Diagnosis was not closely associated with lengths of service episode as hypothesised. This meant that the duration of treatment was quite independent of the diagnosis. However, those who did have the longest service episodes were children who were diagnosed with specific developmental disorders including speech and language disorders, scholastic disorders or pervasive developmental disorders including Autism and Asperger's syndrome. Developmental disorders may have been more difficult to treat over time or may have more chronic problems associated with them. Some developmental disorders such as profound Autism may be associated with very severe psychosocial problems requiring

interdepartmental case management thus requiring longer service episodes to do such work. Eating disorders are known for their chronic nature and many young people with an eating disorder require both inpatient and outpatient treatment, and may require more than one service episode. Therefore chronic problems such as eating disorders may reflect the longer mean lengths of service episodes. The children with these diagnoses may have been referred to CYMHS versus the paediatric outpatient due to the presence of co-morbid problems associated with developmental disorders. It may have been that this team did not have specialist knowledge in the treatment of these disorders or it took longer for the case manager to build in supports through case management and link these clients with other relevant services in the community.

Similar to the Harnett et al (2005) study, lengths of service episodes were not associated with individual HoNOSCA scores at assessment. Differences in lengths of service episode may have also been due to the severity or complexity of presenting problems with some problems being more or less amenable to individual therapy or case management over time. Lengths of service episode may also have been affected by differences in case management. For example, some severe problems require multi-agency input and others do not. One implication of this research is that clinicians will need to rely on highly developed clinical intervention skills that are evidence- based for the treatment of the full range of anxiety and affective disorders. In addition, clinicians need to be quite skilled in treating the behavioural disorders including oppositional defiant disorder, conduct disorder and hyperkinetic disorder. However, an analysis of mean lengths of service episodes reveals that these anxiety and affective disorders do not require the length of episode as some other disorders such as developmental disorders. This may in fact indicate that anxiety and affective disorders are amenable to treatment or resolve quicker over time than other disorders such as eating disorders or psychotic disorders.

The Factor Structure of the HoNOSCA

Confirmatory factor analyses in this research did not confirm the original four-factor HoNOSCA structure proposed by the team who developed the scale (Gowers et al. 2000). The original subscales were found to have low reliability and only when the four subscales were combined was the overall reliability of the HoNOSCA scale was found to be adequate. Therefore, caution is advised in using the four factors or 'subscales'. Rather total scores or individual item scores must be used instead in both research and in clinical practice. This finding supports the conclusion drawn by Harnett et al. (2005) and suggests major challenges to the construct validity of the HoNOSCA.

The results of this research found a five-factor structure without complexity. The emergence of a five-factor structure from this research may reflect findings of recent research into the factor structure of the parent scale, the HoNOS which suggests that the reliability of the original four-factor structure of this scale was well outside levels of acceptability (Eagar et al. (2005). However, the item loadings within five factors found in this study were inconsistent with the item loadings in the five factors that Eagar et al. suggested. Eagar et al. found Factor 1 'Hallucinations and delusions', Factor 2 'Behaviour' (including items about aggression and drug and alcohol misuse), Factor 3 'Social' (including items about accommodation, occupation and leisure, activities of daily living and relationships), Factor 4 'Depression' (including items about relationships, deliberate self-harm, depressed mood and other symptoms) and Factor 5 'Impairment' (including items about cognitive problems and physical problems). The five-factor structure found in this research is difficult to interpret and inconsistent with other investigations of the HoNOS. With such internal consistency challenges, further scale development may enhance the HoNOSCA.

Severity Profiles of Disorder Categories

The development of visual HoNOSCA mean item severity profiles for the different ICD-10 diagnostic categories provide interesting information although these profiles are only a pilot investigation and are based on low numbers in each diagnostic category. For example, these results indicated that those children and adolescents diagnosed with mood and anxiety disorders may share very similar problems and such problems may differ in many ways from other categories such as children and adolescents who have been given the diagnosis of behavioural disorders. For example, these diagnostic groups all demonstrated elevations on Item 12 'Problems with family life and relationships'. However, if further research used a large sample (e.g. national or state-wide data) with appropriate numbers of HoNOSCA cases per diagnostic category, it could generate more meaningful profiles for comparison. Furthermore, if standardized scores were used, clinicians then could compare an individual client's item severity profile against these national or state-wide standardized scores. A clinician could then use this information to guide the assessment process. For example, the profile for behavioural disorders suggests that children or adolescents with behavioural disorders including oppositional and defiant disorder, conduct disorder or hyperkinetic disorders experience moderate problems with emotional and related symptoms. Having knowledge of this information may guide a clinician to assess more closely for co-morbid anxiety or depressive symptoms and treat accordingly. Conversely, if an individual referred with a possible mood or anxiety disorder scored very low on emotional and related symptoms, a clinician may investigate whether the individual is underreporting symptoms experienced.

Discriminant Ability

This study hypothesised that the HoNOSCA can discriminate between different diagnoses. These results indicated the HoNOSCA items can discriminate between

internalisation and externalization disorders. More specifically, mood and anxiety disorders can be distinguished from behavioural disorders as measured by HoNOSCA item elevations. The HoNOSCA items however, cannot discriminate between mood and anxiety disorders as hypothesised. One possible interpretation of this result may be that internalization and externalization disorders differ significantly in their nature with both anxiety and depressive disorders being similar or within a similar diagnostic dimension. Another reason the HoNOSCA items could not further discriminate between diagnostic categories may have been due to some categories in this study containing small numbers. A discriminant function analysis may have produced more comprehensive results if all categories contained equal numbers of cases.

Prior to this research, it was found that the HoNOSCA could discriminate between inpatient and outpatient populations (Harnett et al. 2005). This exploratory research suggests that upon larger sample sizes, further Discriminant Functional Analysis between various categories of disorder could be an interesting consideration for future research. In addition, further research may consider exploring the discriminant ability of a revised version of the HoNOSCA including items reflecting contributions from theory.

Standardisation

This study hypothesised that the derivation of standardized scores for the HoNOSCA would expand the current body of HoNOSCA research which may assist with the interpretability of the HoNOSCA items. For a psychometric scale to be of value in clinical practice, the score of a patient needs to be standardized and interpreted in context with scores on comparable items. This research project proved that standardisation of the HoNOSCA is possible based upon a sufficient sample size (e.g. national or state-wide data). Therefore standardization may now be considered a goal for further research in the future.

Standardization of the HoNOSCA may more clearly determine the severity of any given item score on an individual score level. In addition, standardized scores could also be grouped and coded. For example the severity rating of items could be coded as follows: Category 'Red' may reflect standardized scores above 81 and high severity of problems; 'Yellow' may reflect standardized scores between 65 and 80 and moderate problem severity; and 'Green' may reflect standardized scores below 64 and below and low severity. If a person scored a HoNOSCA raw score of 4 on item 4 (problems with alcohol, substance or solvent misuse), this may indicate a t-score of 105 and indicate severe problems in this area. A score of 4 on item 12 (problems with family life and relationships) may indicate a t-score of only 66 reflecting moderate severity in this area. It may be possible from this information, maybe along with risk assessment information for coloured indicators to be placed on client charts to inform any CYMHS clinician, emergency or triage staff of problem severity at a glance thus expediting appropriate treatment. Clinicians had the opportunity to generate a bar graph to represent the HoNOSCA profile for each individual's HoNOSCA raw scores. Further development of the HoNOSCA may include presenting graphical information in standardized form thus easing interpretation of scores. In addition, if the graphical information also included the typical severity profile for any given disorder, the clinician could accurately compare the individual's scores against both means and standardized data.

Part B: Exploring Construct Validity of the HoNOSCA

Study 4: The HoNOSCA and Analysis From Within the Category of Neurotic and Stress Related (Anxiety) Disorders

The previous study compared the number of participants diagnosed with various disorders and found that anxiety disorders were diagnosed most frequently within this sample of children and adolescents. This study extends the examination of the construct validity of the HoNOSCA from within the diagnostic category of neurotic and stress-related disorders

which includes all relevant anxiety disorders. This appears to be a unique approach as no research exploring the HoNOSCA from within any particular group of disorders was found.

Evidence in the literature has indicated that anxiety disorders in childhood may lead to severe emotional, social, health and economic consequences over the long term, especially when left untreated. Epidemiological studies highlight these issues which are discussed in this chapter to provide background to the investigation into the construct validity of this diagnostic category.

The Epidemiology of Anxiety Disorders in Children and Adolescents

The epidemiology of anxiety disorders has been investigated through both community studies and clinical samples (Mash & Barkley, 2003). Typically community epidemiological studies show lower rates of anxiety than clinical studies do. However, this is to be expected as many youths who are suffering from these conditions will be brought to treatment (especially as impairment and distress escalate). Some of the most current prevalence rates for types of anxiety disorder are now outlined.

Separation Anxiety Disorder (SAD) is characterized by extreme, developmentally inappropriate anxiety in the child when separated from a primary caregiver such as a parent (Cronk, Slutske, Madden, Bucholz & Health, 2004). SAD is relatively common when compared with other childhood psychological disorders. Prevalence rates range from 1 – 13% depending on the study (Silverman, Ginsburg, Weems & Hammond-Laurence, 1998), and a prevalence rate of 4% is noted in the DSM-IV (American Psychiatric Association, 2000). The 4% prevalence rate is consistent with what was found in the Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) study when parents' reports and children's reports were combined (Shaffer, Fisher, Dulcan, Davies, Piacentini, Scwab-Stone, Lahey, Bourdon, Jensen, Bird, Canino & Regier, 1996). The peak age of onset was between seven and nine years of age. Girls were more likely than boys to experience separation anxiety

disorder. There was some indication that children from lower socioeconomic status groups and children whose parents have limited education were more likely to experience separation anxiety disorder but the limited research suggests that there were no racial or ethnic difference in the prevalence rates of separation anxiety disorder (Silverman & Ginsburg, 1998).

Specific Phobia is characterized by extreme fears of objects or situations and is relatively common within childhood and adolescence. Between 2.4 to 3.3% of children and adolescents are thought to meet criteria for specific phobia with the MECA study finding a prevalence rate of 2.6% when parents' and children's reports were combined (Shaffer et al., 1996). Higher prevalence rates have been reported in other countries such as Sweden (Lichtenstein & Annas, 2000). The average age of onset of specific phobias is between seven and eight years of age and specific phobias tend to peak between the ages of 10 and 13 (Silverman and Ginsburg, 1998). Girls are more likely than boys to experience a specific phobia although this gender difference is not always found. It may be that gender role orientation is more important than gender per se in the prevalence rates of specific phobias. Almost no research has been done to investigate differential prevalence rates regarding socioeconomic status or race and ethnicity (Silverman & Ginsburg, 1998).

Social phobia describes a fear that in social situations, the child may embarrass her or himself or attract negative evaluation. Prevalence rates of social phobia in childhood and adolescence range from 1% to 3% with very low rates in childhood and higher rates in adolescents. Social phobia rarely occurs before the age of 10 with the average age of onset occurring between 11 and 12 years of age (Van Brakel, Muris, Bogels & Thomassen, 2006). In clinical samples, girls outnumber boys for treatment of social phobia although according to Beidel and Morris (1995) this gender difference is not found in every study.

Obsessive-Compulsive Disorder (OCD) is a very distressing disorder that occurs when a child or adolescent has disordered thoughts, ideas or images (called obsessions) or disordered repetitive behaviours (called compulsions). OCD is thought to be relatively rare with a lifetime prevalence rate of 1% noted in a study of adolescents (Geffen, Pincus & Zelikovosky, 1999), and less than 1% in children under the age of 10. However, Geffen et al. suggest that given that OCD is often a hidden disorder and that the prevalence rates may be an underestimation of the actual occurrence of OCD in childhood and adolescence.

OCD most often occurs first in adolescence or early adulthood. It is rare for young children to develop OCD but may appear as obsessionality rather than meeting full clinical criterion. Prevalence rates regarding gender show approximately similar numbers of boys and girls diagnosed with OCD. According to March and Mulle (1998) an interesting pattern emerges when age and gender are explored. Boys are more likely to receive a diagnosis of OCD before puberty.

Generalized Anxiety Disorder (GAD) was formally known as overanxious disorder. It occurs when children or adolescents experience a pervasive and chronic level of anxiety and worry (Phares, 2003). Epidemiological data suggest that GAD is present in 2% to 19% of children and adolescents (Silverman & Ginsburg, 1995). GAD is more prevalent in adolescents than in children. During adolescence and into adulthood, GAD is more common in females than in males (Silverman & Ginsburg, 1995). Children from middle and higher socioeconomic status are found more frequently in clinical facilities than are children from lower SES families. According to Phares (2003) there has been almost no research into anxiety of youth of different racial and ethnic origins.

Post Traumatic Stress Disorder (PTSD) occurs when children or adolescents experience some type of traumatic event and have more problems related to the event than would otherwise be expected (Udwin, Boye, Yule, Bolton & O'Ryan, 2000). One review of

epidemiological data suggests that a remarkable 36% of all children and adolescents could meet the criteria for PTSD (Fletcher, 1996). This number is the combination of interesting age trends where 39% of preschoolers, 33% of elementary school children and 27% of adolescents meet criteria for PTSD. Fletcher (1996) stated that PTSD is more common in younger children as compared to adolescents. Other studies explored by Udwin et al. (2000) suggested lower prevalence rates closer to 5%.

Epidemiological studies suggest that girls are more at risk for the development of PTSD than are boys. According to Phares (2003) little is known about the prevalence rates related to socioeconomic status and there are no known differences when racial and ethnic groups are compared. Apparently there is little research on PTSD in children other than in reaction to physical and sexual abuse (Phares, 2003).

Evidence is amassing indicating that anxiety disorders in childhood lead to severe emotional, social, health and economic consequences over the long term, especially when left untreated. In addition to the studies cited above, a follow-up study of a New Zealand adolescent cohort Woodward and Ferguson (2001) found associations between the presence of an anxiety disorder at ages 14 – 16, and later risks for mental health problems, educational problems and social role outcomes in 964 respondents available at ages 18 – 21 years. Significant linear associations were identified linking the number of anxiety disorders in early adolescence to later risks for anxiety disorders, major depression, nicotine, alcohol and drug dependence, suicidal behaviour, educational underachievement and early parenthood.

The HoNOSCA has not been explored from within any diagnostic category as evidenced by a lack of published research. Brann et al. (2001) supported this notion and recommended that further research should consider this task. Therefore, to continue exploration of the discriminant ability of the HoNOSCA from within a disorder category, the

neurotic and stress related disorders (anxiety disorders) were selected because of their prevalence and distressing nature.

Aim and Hypotheses

This study was designed with two aims. The first aim was to explore some contextual demographic variables specific to anxiety disorders. To test assumptions generated by epidemiological studies, it was hypothesised in this study that more girls than boys would be diagnosed with an anxiety disorder. In addition, it was hypothesised that more adolescents aged between 12 and 18 years of age would be diagnosed with an anxiety disorder than children between the ages of one and 11.

Anxiety disorder literature suggested that anxiety disorders often follow a chronic course, therefore it was hypothesised that anxiety disorders will require longer rather than shorter service episodes for treatment. However, given that the literature suggests that anxiety disorders are amenable to psychological treatment, it was hypothesised that significant change in problem severity would occur over time as measured by change in scores between assessment and discharge (pre- and post-episode) HoNOSCA scores.

The second aim of this study was to extend discriminant analyses conducted in Study 1 by testing the discriminant ability of the HoNOSCA from within a diagnostic category, that of anxiety disorders. The hypothesis generated was that from within the category of neurotic and stress related disorders, the HoNOSCA could discriminate between anxiety disorders.

Method

Participants

This study was a continuation of the first study in that the same data set was used. Those cases with a diagnosis of an anxiety disorder were selected by diagnostic code from the OIS data set used in the first study. A total of 83 cases had received a primary diagnosis

of a neurotic and stress related disorder (an anxiety disorder) and out of these 63 cases had both assessment and discharge (pre- and post-) HoNOSCA scale scores.

Procedure

As described in an earlier section, the diagnosis given to a child or adolescent is made through the process of a psychiatric or clinical assessment. The assessment, formulation, diagnosis and treatment plan are presented in case conference and confirmed by the psychiatrist. As a mandatory requirement the HoNOSCA data is also collected within the assessment process. The diagnosis and HoNOSCA scores specific to each child or adolescent are entered into a database by the clinician.

Analysis of this data set was conducted through the use of SPSS Graduate Pack15.0 for Windows. Data analysis included determining the mean scores of demographics and mean subscale scores of individual subscales. Analyses were conducted through the use of T-tests, Chi Squared crosstabulation and discriminant functional analysis.

Results

The Range of Anxiety Disorders

Table 3.15 shows the range of anxiety disorders treated by Toowoomba CYMHS during 2003 - 2007. Of all the anxiety disorders, 42.2% of those diagnosed with an anxiety disorder met diagnostic criteria within the ICD-10 F43.0 to F43.9 category of 'reactions to severe stress and adjustment disorders'. Within this group 22.2% experienced symptoms consistent with an Adjustment Disorder, 10.0% experienced symptoms consistent with Post-Traumatic Stress Disorder, 7.8 % of the sample population had symptoms consistent with a diagnosis of Acute Stress Reaction, 1.1% experienced symptoms consistent with a diagnosis of 'Other reactions to severe stress', and 1.1% of the sample population experienced symptoms consistent with a diagnosis of Reaction to Severe Stress Unspecified. These results

indicated that many of the young people presenting to Toowoomba CYMHS had experienced trauma, acute stress or personally frightening events.

Table 3.15

Percentages of Children and Adolescents Diagnosed with Specific Anxiety Disorders

Anxiety Disorder	Percent *(n=83)*
F40.1 Social Phobias	2.2
F41.0 Panic Disorder	1.1
F41.1 Generalised Anxiety Disorder	8.9
F41.2 Mixed Anxiety and Depressive Disorder	4.4
F41.9 Anxiety Disorder unspecified	13.3
F42.2 Mixed Obsessional Thoughts and Acts (OCD)	3.3
F43.0 Acute Stress Reaction	7.8
F43.1 Post-traumatic Stress Disorder	10.0
F43.2 Adjustment Disorders	22.2
F43.8 Other reactions to severe stress	1.1
F43.9 Reaction to severe stress unspecified	1.1
F93.0 Separation Anxiety Disorder of Childhood	2.2

From Table 3.15 it is clear that many children and adolescents were diagnosed with reactions to severe stress and adjustment disorders within the ICD-10 F43 category which accounted for 42.2% of the sample population. Other anxiety disorders within the ICD-10 F41 category accounted for the sum of 27% of the sample population. This category includes Panic disorder, Generalised Anxiety Disorder, mixed anxiety and depressive disorder and anxiety disorder unspecified. A smaller percentage of the population were given diagnoses

such as F40.1 Social Phobia, F42.2 Obsessive Compulsive Disorder and F93.0 Separation Anxiety Disorder of childhood.

Gender

Frequency analysis confirmed the hypothesis that more females (57.5%) were diagnosed with an anxiety disorder than males (41.4%) and this difference was found to be statistically significant ($\chi^2 = 10.89$, $df = 3$, $p < .05$) as shown in Table 3.16. The anxiety disorders were then grouped according to ICD-10 subgroups for further analysis. More females than males were diagnosed with F40 'Phobic anxiety disorders', F42 Obsessive-Compulsive Disorder (OCD) and F43 'Reaction to severe stress and adjustment disorders'. More males than females were diagnosed with F41 'Other anxiety disorders' including Panic Disorder, and Generalized Anxiety Disorder.

Table 3.16

Frequency of Males and Females Per Anxiety Disorder Subgroup

	Anxiety Grouped				
	F40 Phobic Anxiety Disorders	F41 Other Anxiety Disorders	F42 OCD	F43 Severe Stress Disorders	Total
Male	1	19	3	10	35
Female	1	16	1	31	50
Total	2	37	4	42	83

Age

The mean age of adolescents accessing the service with a diagnosis of an anxiety disorder was 13.05 years of age. Two age groups were created to improve ease of analysis. Children aged one to 11 years of age were classified into one group and adolescents 12 -18

years of age were categorised into another. The age groups were then crosstabulated with all anxiety disorders in this sample as shown in Table 3.17. More adolescents aged 12-18 years of age than children under the age of 11 were found in this sample population. This age difference was found to be significant ($\chi^2 = 10.23$, $df = 3$, $p < .05$) supporting the hypothesis that significantly more adolescents than children presented to the service with any diagnosis of an anxiety disorder.

Table 3.17

Frequency of Children and Adolescents per Anxiety Disorder Group

	Anxiety Grouped				Total
	F40 Phobic Anxiety Disorders	F41 Other Anxiety Disorders	F42 OCD	F43 Severe Stress Disorders	
Children	1	16	0	7	25
Adolescents	1	19	4	34	60
Total	2	37	4	42	83

Lengths of Community Episodes

The mean number of days that a child or young person with an anxiety disorder remained with the service was a total of 220 days or roughly 31 weeks. The range of days with the service was divided into three time frame categories for ease of analysis: short, medium and long term service episodes. As depicted in Table 3.18, the number of cases in each category was spread evenly over the three time frame categories. This result does not support the hypothesis that since anxiety disorders follow a chronic course, children and adolescents with an anxiety disorder will require a longer rather than shorter episode of

service. Children and adolescents with an anxiety disorder can have short, medium or longer term treatment episodes.

Table 3.18

Percentages of Short-, Medium- and Long-term Service Episodes

Timeframe	Percentage
Short-term	31.9%
Medium-term	33.2%
Long-term	34.8%

Note: Short term = 20 – 109 days, Medium term = 110 – 251, Long term = 252 - 675

HoNOSCA Change Scores Between Assessment and Discharge

The mean pre- and post-treatment HoNOSCA scores for the 83 children and adolescents diagnosed with an anxiety disorder are presented in Table 3.19. The significance of pre- and post- test differences was tested using t-tests with significance scores noted in the final column of the table. Higher mean scores (up to and including a score of four) indicate greater impairment, distress and clinical significance, and lower scores (as low as a score of zero) indicate better functioning. Scores between two and four indicated a problem of clinical significance ranging from moderate to extreme severity.

Table 3.19

Means of Assessment and Discharge HoNOSCA Scores

HoNOSCA Item	Pre-	*sd*	Post-	*sd*	*t*	*df*	Sig(2-tailed)
1. Behaviour	1.14	1.16	0.58	.89	4.66	62	.000***
2. Over activity	1.27	1.06	0.65	.84	5.53	62	.000***
3. Non-accidental self-injury	1.12	1.3	0.22	.58	5.72	62	.000***
4. Alcohol, or solvent misuse	0.24	.66	0.17	.66	0.57	62	.568
5. Scholastic or language skills	0.88	1.46	0.69	1.56	0.74	62	.465
6. Physical illness or disability	0.30	.75	0.17	.52	1.43	62	.159
7. Hallucinations, delusions	0.34	.80	0.09	.38	2.72	62	.008**
8. Non-organic somatic	1.13	1.15	0.50	.83	4.20	62	.000**
9. Emotional symptoms	2.67	.64	1.52	1.04	9.24	62	.000***
10. Peer relationships	1.50	1.1	0.87	1.00	4.42	62	.000***
11. Self-care and independence	0.41	.83	0.14	.39	2.79	62	.007**
12. Family life and relationships	2.13	1.12	1.25	1.16	6.06	62	.000***
13. Poor school attendance	0.77	1.51	3.12	4.11	-4.7	62	.000***

Note: ***The mean difference is significant at the 0.001 level. ** The mean difference is significant at the 0.01 level.

It was suggested by literature that anxiety disorders follow a chronic course and are associated with a high degree of distress. However, because anxiety disorders were considered amenable to change through psychological intervention it was hypothesized that the severity of problems would change significantly over time. Indeed, comparison of pre- and post- HoNOSCA item scores showed that many items demonstrated significant reduction indicating a reduction of severity on those items.

Many HoNOSCA items demonstrated significant differences between assessment and discharge which may suggest symptom reduction, perhaps as a consequence of treatment. The results indicate that the severity of a variety of problems associated with anxiety disorders may be quite amenable to significant change during a CYMHS service episode. More importantly, the data supports the efficacy of the HoNOSCA as a clinical tool to monitor change in anxiety in children and adolescent. The items that did not demonstrate significant score reduction were Item 4 Alcohol, solvent or substance misuse, Item 5 'Problems with scholastic or language skills' and Item 6 'Physical illness or disability problems'. These items may not have demonstrated significant reduction in severity because they were initially rated as either 'no problem' or 'mild problem' upon assessment.

HoNOSCA and Discrimination From Between Anxiety Disorders

Study 3 in Part B of this research found that the HoNOSCA could discriminate between internalization disorders (mood and anxiety) and externalization disorders such as behavioural disorders. This study hypothesised that the HoNOSCA can discriminate between the ranges of specific anxiety disorders. The further explore the discriminant ability of the HoNOSCA, specific diagnoses were grouped according to ICD-10 groupings. For example, F41.0 – F41.9 were grouped into the subgroup of F41.

The first discriminant function analysis was performed to test the hypothesis that the HoNOSCA can discriminate between phobic anxiety disorders, other anxiety disorders, OCD and reactions to severe stress. The results show that 55.3% of grouped cases were correctly classified. The classification was evaluated by testing the significance between the lambdas. Wilks' Lambda 1 through 3 was ($F = .563$, $p > .05$). Wilks' Lambda 2 - 3 was ($F = .718$, $p > .05$) and Wilks' Lambda 3 was ($F = .873$, $p > .05$). The results (Table 3.20) showed no significant discrimination was found between these anxiety disorders based on HoNOSCA item scores. Thus the hypothesis was not supported.

Table 3.20

Discriminant Function Analysis of Scores on Phobic, Other, OCD and Stress Related Disorder Variables.

Predictor Variable	Function 1	Function 2	Function 3
H1. Problems with behaviour	-.145	-.406	.913
H2. Problems with overactivity	-.107	.446	.106
H3. Non-accidental self-injury	.279	.509	.151
H4. Alcohol, substance solvent misuse	1.182	-.199	.363
H5. Problems with scholastic	.024	-.349	-.897
H6. Physical illness or disability	.277	1.027	-.243
H7. Problems with hallucination	-.353	-.326	-.348
H8. Problems with somatic symptoms	-.015	-.466	.220
H9. Emotional and related symptoms	.579	-.212	-.338
H10. Problems with peer relationships	-.075	.185	-.209
H11. Problems with self-care	-1.081	.008	.254
H12. Problems with family life	-.045	.209	.102
H13. Poor school attendance	-.445	-.115	.250
Canonical R	.465	.421	.356
Eigenvalues	.277	.215	.145
Significance	.564	.647	.684

Actual Group	Predicted Group Membership				Total
	Phobic Disorders	Other Disorders	OCD Disorders	Stress Disorders	83
	n	*n*	*n*	*n*	
Phobic	2	0	0	0	2
Other	4	20	4	8	36
OCD	1	0	3	0	4
Stress	0	15	5	20	40

Discriminant function analysis was repeated to determine whether reactions to severe stress and adjustment (group F43) could be discriminated from other anxiety disorders (group F41). The analysis is of particular interest because these two groups contained the highest number of cases. Furthermore, trauma and stress related disorders may be considered more reactive conditions versus disorders such as GAD which may be considered endogenous. The results show that 67.1% of grouped cases were correctly classified. The classification was evaluated by testing the significance between lambdas. The significance of Wilks' Lambda was ($F = .818$, $p > .05$). The results in Table 3.21 showed no significant discrimination was found between trauma and other anxiety disorders based on HoNOSCA item scores. Similarly, this result does not support the hypothesis that the HoNOSCA can discriminate between anxiety disorders.

Table 3.21

Discriminant Function Analysis of Scores on Stress and Other Anxiety Disorders

Predictor Variable	Function
H1. Problems with behaviour	-.013
H2. Problems with overactivity	.414
H3. Non-accidental self-injury	.526
H4. Alcohol, substance solvent misuse	.562
H5. Problems with scholastic	-.628
H6. Physical illness or disability	.909
H7. Problems with hallucination	-.649
H8. Problems with somatic symptoms	-.272
H9. Emotional and related symptoms	-.055
H10. Problems with peer relationships	.011
H11. Problems with self-care	-.470
H12. Problems with family life	.191
H13. Poor school attendance	-.140

Canonical R .427

Eigenvalues .223

Significance .527

Actual Group	Predicted Group Membership		Total
	Stress Disorders	Other Disorders	79
	n	*n*	
Stress Disorders	26	16	42
Other Disorders	10	27	37

Conclusion

This study addressed the lack of published research on the HoNOSCA from within a specific diagnostic category. This study tested the hypotheses that more girls than boys and more adolescents than children were diagnosed with an anxiety disorder. In addition, this study tested the hypotheses that those with an anxiety disorder will require longer service episodes and little change will be demonstrated over time due to the chronic nature and high degree of distress often associated with anxiety disorders. Furthermore, this study explored the discriminant ability of the HoNOSCA and tested the hypothesis that the HoNOSCA item elevations can discriminate between anxiety disorders.

The results of this study support epidemiological studies by confirming the hypothesis that many of those diagnosed with an anxiety disorder are adolescent females. Furthermore, these results confirm findings such as those by Harnett et al (2005) who found that more female adolescents experience internalization disorders. However, this study specified that many of the females diagnosed with anxiety disorders were found to experience acute stress disorder, post-traumatic stress disorder or adjustment disorders. This result supports post-traumatic stress prevalence studies (Udwin et al. 2000; Fletcher, 1996) that indicated that females are more likely to experience clinically significant symptoms as a result of a range of potentially traumatizing events. The Toowoomba CYMHS, like many other Child and Youth Mental Health Services, has historically worked closely with the local Department of Child Safety and has accepted referrals of young people who have experienced frightening events, physical and sexual abuse and neglect. The number of cases of adjustment problems, severe stress and post-traumatic stress disorder found in this study may reflect the unfortunately high prevalence of such problems in the wider community. Further research is required to investigate the prevalence of these disorders, and what factors influence gender differences in prevalence.

This study hypothesised that due to the chronic nature of anxiety disorders, those diagnosed with an anxiety disorder would require longer rather than shorter service episodes. The results found that those diagnosed with an anxiety disorder may engage with a mental health service for varied lengths of time. Equivalent numbers of cases engaged for short-, medium- and long-term service episodes were found in this study disconfirming the hypothesis that anxiety disorders required longer service episodes due to their chronic nature. However this research did not find reasons for this pattern. One possibility for varied lengths of service episodes may be that some anxiety disorders may be quite amenable to psychological treatment. Possibly other factors contributed to lengths of service episode. As suggested in the face validity focus group study, reasons for varied lengths of service episode may include the consumer dropping out of treatment or clinical decisions such as referral to private practitioners for ongoing therapy, keeping a case open to monitor relapse prevention plans or the decision to monitor symptoms over the duration of titration off medication. Further research could focus upon these variables and whether lengths of service episodes differed between diagnostic categories such as behavioural disorders, psychotic disorders, developmental disorders and mood disorders.

Anxiety disorders are known to potentially set the trajectory from childhood to severe and complex mental health problems through into adulthood if left untreated. This study hypothesised that problems often associated with anxiety disorders could change significantly with treatment during a service episode. Many problems as indicated by reductions in HoNOSCA item scores reduced over time. Furthermore, these results indicate that the HoNOSCA is helpful in monitoring change in symptoms in youth. This finding was expected as it supports previous research such as that by Brann et al. (2001), and Harnett et al. (2005). Many of the problem areas that were moderate to severe and in the clinical range reduced in severity over the course of service episodes regardless of the length of service episode.

The discriminant ability of the HoNOSCA was explored from within the diagnostic category of neurotic and stress related disorders; anxiety disorders. The HoNOSCA could not discriminate between anxiety disorders as hypothesised. More specifically, ratings on the HoNOSCA items could not be used to discriminate between acute stress and PTSD from Obsessive Compulsive Disorder, Panic Disorder, Social Phobia, or Generalized Anxiety Disorder. Items that did contribute the most to the discrimination between anxiety disorders were Items 1 'Behavioural problems', Item 9 'Problems with emotional and related symptoms' and Item 10 'Problems with peer relationships'. The lack of discrimination between anxiety disorders may reflect the notion that anxiety disorders have similar psychosocial vulnerabilities, or reflect the notion that all anxiety disorders are considered internalization disorders.

This study is not without limitations. Further to limitations outlined in previous sections, this research was conducted in a regional community outpatient setting. Due to this process, comparison against other clinical or community samples was not conducted and the results of this study may not be indicative of other regional services or services based in city or suburban centres. Furthermore, the sample size was small and may have compromised analyses and subsequent generalizations. Further research could be conducted on a state-wide basis using state-wide data.

In conclusion, this study supports the efficacy of the HoNOSCA as a clinical tool to monitor change in problems associated with anxiety disorders. However, the HoNOSCA was not found to be useful in discriminating between anxiety disorders in this study. This study also highlights the notion that although anxiety disorders may be chronic and associated with high degrees of distress if untreated, they may be amenable to treatment within an episode of service from a child and youth mental health service.

GENERAL DISCUSSION

The developers of the Health of the Nation Outcome Scales considered them the 'gold standard' of outcome measurement; a claim that presumably extends to the child and adolescent adaption of the scale, the HoNOSCA. However, the theoretical and statistical critique of the HoNOSCA in this thesis suggests that it may fall short of this lofty accolade. The current version of the HoNOSCA emerged from this scrutiny with some merits and limitations in terms of content and construct validity.

The HoNOSCA has merit in that Study 1 in this thesis showed that it contains some items that reflect theoretical underpinnings. For example, the HoNOSCA appeared to reflect risk and protective factors such as problems concerning family life and relationships, peer relationships and school attendance as suggested by the developmental psychopathology framework.

As discussed previously, the HoNOSCA has no items assessing biological aspects of developmental psychopathology despite the strong body of research emphasizing the importance of such theory. The content validity of the HoNOSCA could be improved by reference to biological or behavioural genetic theory.

The content validity of the HoNOSCA may be improved through inclusion of items reflecting theories of family functioning and attachment theory. Although Item 12 measured the severity of problems within the family such as the presence of rejection, hostility, abuse, and breakdown within the family, another item measuring problems associated with attachment type or attachment difficulties would reflect one of the most important contemporary theories for understanding psychopathology not only in childhood and adolescence but also in adulthood.

Contributions from cognitive and schema theory may enhance the content validity and the developmental sensitivity of the scale. Inclusion of an item measuring the severity of

maladaptive thoughts and schemas may strengthen theoretical underpinnings of the HoNOSCA and link closely to therapeutic interventions initiated within episodes of service. Cognitive therapy, schema therapy and cognitive behavioural therapy are major evidenced-based interventions used by mental health clinicians for a majority of problems. Rating the change in maladaptive thoughts and beliefs may link with change in many other item elevations.

The theoretical critique of the HoNOSCA also highlighted a question for further investigation. This question pertains to whether the HoNOSCA should measure only symptoms and impairments that have occurred as a result of disorder, or measure predisposing and other associated problems as well.

The current version of the HoNOSCA was found to have adequate face validity as tested by CYMHS clinicians as suggested in Study 2. The scale was generally perceived positively and perceived to make logical links between item elevations and characteristics of a range of disorders. This finding supports the reported positive view of the HoNOS as investigated by Pirkis et al (2005). Staff did not perceive the HoNOSCA to purely be a symptom and impairment checklist but more a non-psychometric scale measuring the severity factors commonly associated with a range of disorders. Staff suggested that some items required specialist developmental knowledge to rate accurately and that the two-week rating period may have distorted the recorded severity of problems.

In Study 3 the HoNOSCA was found to have some discriminative ability. The scale seemed able to discriminate between internalization (mood and anxiety) and externalization (behavioural) disorders. However, further discriminant function analysis in Study 4 found that the HoNOSCA could not discriminate from between anxiety disorders. This finding expands the current body of literature regarding the discriminant ability of the HoNOSCA.

Prior to this research, the scale was found to be able to discriminate between inpatient and outpatient samples (Brann et al., 2005). This thesis supports the notion that the HoNOSCA appears to be sensitive to changes in problem severity over time (Gowers et al., 2000, Wing et al., 2000) as evidenced by significant reductions in item scores between assessment and discharge in the sample of those diagnosed with an anxiety disorder in Study 4. However, as Harnet et al. (2005) suggests, simply comparing the pre- and post-intervention differences will obscure the range of factors contributing to the functioning of these individuals.

The HoNOSCA was found to have some clear limitations regarding the underlying factor structure. Confirmatory factor analyses in this thesis could not support the four-factor structure of the HoNOSCA as proposed by its originators (Gowers et al. 2000). Such a result may reflect poor fit of factors within the original HoNOS as suggested by Eagar et al. (2005) who proposed a revised five-factor version of the HoNOS as mentioned previously. A five-factor model was explored for the HoNOSCA in Study 3, but it was not satisfactorily interpretable. These results suggest that both the content and structure of the HoNOSCA are open to further investigation.

A limitation of the HoNOSCA in its current form is that it has not yet been standardized. Although the results of Study 3 represent no more than a pilot study, the results of this thesis suggest that standardization is possible. A clear opportunity exists to use national or state-wide normative data to standardize the HoNOSCA which may make interpretation of HoNOSCA more meaningful.

One limitation of this study may be rater bias in HoNOSCA scoring. In some cases the same clinician may have rated an individual's HoNOSCA items at assessment, review and at discharge. It is possible that ratings may have been made by a clinician motivated to reflect a greater or lesser degree of change over time, and it is possible that a clinician may

have drawn a conclusion of severity based on insufficient information. However, one strategy that was implemented by the team to reduce the chance of bias was through the process of case conferencing. All clinicians are required to present the assessment, diagnosis, treatment plan and associated HoNOSCA scores to the entire multidisciplinary team in case conference. If inconsistencies or obvious errors in HoNOSCA ratings occur, the clinician is advised to change the scores to reflect severity of problems more accurately. Furthermore, another strategy used to reduce rater bias is to encourage clinicians to rate HoNOSCA items based on information gathered not only through observation and assessment but also from sources including parents, family members and teachers.

Any modification to the HoNOSCA would require extensive testing but revision of the scale may have some advantages and disadvantages. One disadvantage of modifying the HoNOSCA may be the increased number of items if the scale were to incorporate additional items. A longer scale may mean longer time for a clinician to fill out. Longer administration time is one factor that may decrease ease of administration. Another disadvantage of revising HoNOSCA items may be that new items such as one measuring problems associated with attachment type may require specific clinical training in order for such problems to be rated accurately.

Revision of the HoNOSCA may have advantages for clinical application. More HoNOSCA items may enhance the scale's ability to monitor and review a wider range of relevant problems associated with disorder or more specific problems. As thorough clinical assessment ultimately guides formulation, diagnosis and treatment planning, a revised version of the HoNOSCA may improve clinical utility given that it could reflect more key areas of a comprehensive clinical assessment. Further research using the HoNOSCA as a research tool could result in improved understanding of child and adolescent disorder development and the nature of specific disorders such as anxiety disorders in childhood.

In conclusion, the findings of this thesis provided insight into some of the theoretical and statistical properties of the HoNOSCA. Further challenges include how to use outcome measure information to improve consumer care and achieving agreement on appropriate measures of severity and functioning.

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Appendix A

Focus Group Stimulus Questions

1. The CYMHS service is mandated to treat children and adolescents from 12 months to 18 years of age. What is your perception of the age range of the children and adolescents that most frequently present for treatment?
2. What range of disorders does this team typically treat?
3. Is there a trend or a relationship between gender and type of disorder?
4. Do you think that some children and young people with certain disorders typically require shorter or longer service episodes? Is there a link between the presenting disorder and length of service episode?
5. The HoNOSCA is a routine outcome measure that must be completed for every child and adolescent at assessment, review and discharge. It is a graphical presentation of the range of factors that influence the severity of problems. Does higher severity mean they will stay with the service longer?
6. Do you think that some disorders appear to have particular patterns of problem elevations?
7. Does staff need specific clinical training to work with the child and youth population?
8. What kind of training do you think you require to do your work effectively?

Appendix B

Director of Queensland Health, Human Research and Ethics Letter of Approval

Queensland Government

Queensland Health

Enquiries to: Jane Jacobs
Principal Advisor
Research and Ethics Advisory Unit
Telephone: (07) 3225 2457
Facsimile: (07) 3221 7535
File Ref DG046405 - 0181-0420-001

0 7 DEC 2006

Ms Karen de Nooyer
Child and Youth Mental Health Service
PMB 2
TOOWOOMBA QLD 4350

Dear Ms de Nooyer

It is with pleasure that I am writing to inform you that your project '*Using Outcome Measures to predict therapeutic change for outpatient children and adolescents within a Queensland Child and Youth Mental Health Service*' has received approval from the Chief Executive, Queensland Health, under Section 281 of the *Public Health Act 2005*. In accordance with this legislation, this approval enables the applicants listed in your application to access and use the specified confidential information, providing they act within the limits detailed in your application submitted on 21 September 2006.

Please display this letter, a signed copy of the Undertaking of Confidentiality and a copy of your application when requesting the confidential information from the relevant information gatekeepers.

The date of approval for access to and use of this confidential information commences from 30 September 2006 and will extend for two months until the 30 November 2006. Should you wish to extend your research project beyond this time, or wish to disclose this information to additional people, you will need to re-apply for further approval for the release of confidential data by the same process.

Congratulations and good luck with the research project.

Yours sincerely

Uschi Schreiber
Director-General
29/ 11/ 2006

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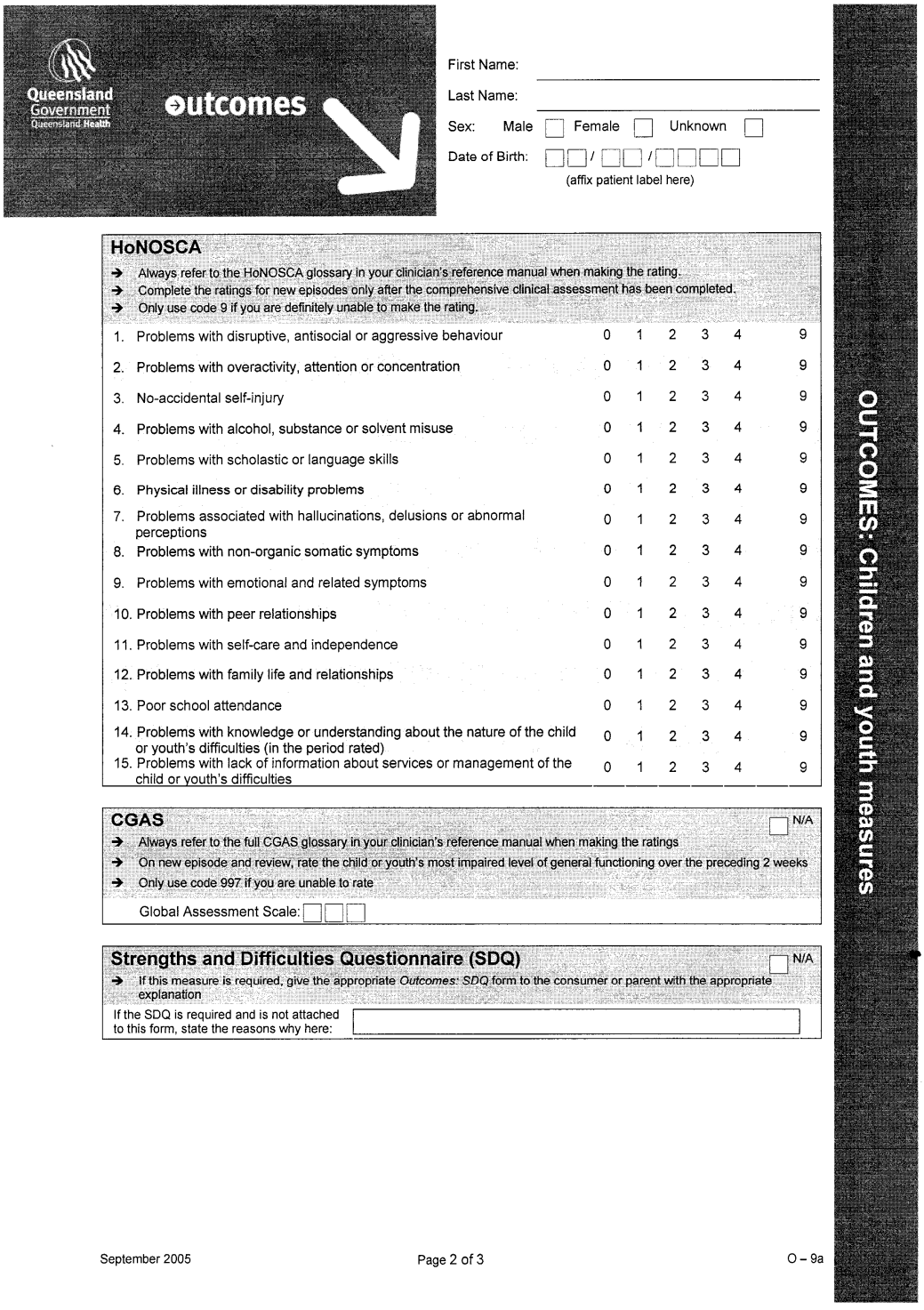
Appendix C

Scanned Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA)



Queensland Government
Queensland Health

outcomes

First Name: _____

Last Name: _____

Sex: Male ☐ Female ☐ Unknown ☐

Date of Birth: ☐☐/☐☐/☐☐☐☐

(affix patient label here)

OUTCOMES: Children and youth measures

HoNOSCA

- Always refer to the HoNOSCA glossary in your clinician's reference manual when making the rating.
- Complete the ratings for new episodes only after the comprehensive clinical assessment has been completed.
- Only use code 9 if you are definitely unable to make the rating.

1. Problems with disruptive, antisocial or aggressive behaviour	0	1	2	3	4	9
2. Problems with overactivity, attention or concentration	0	1	2	3	4	9
3. No-accidental self-injury	0	1	2	3	4	9
4. Problems with alcohol, substance or solvent misuse	0	1	2	3	4	9
5. Problems with scholastic or language skills	0	1	2	3	4	9
6. Physical illness or disability problems	0	1	2	3	4	9
7. Problems associated with hallucinations, delusions or abnormal perceptions	0	1	2	3	4	9
8. Problems with non-organic somatic symptoms	0	1	2	3	4	9
9. Problems with emotional and related symptoms	0	1	2	3	4	9
10. Problems with peer relationships	0	1	2	3	4	9
11. Problems with self-care and independence	0	1	2	3	4	9
12. Problems with family life and relationships	0	1	2	3	4	9
13. Poor school attendance	0	1	2	3	4	9
14. Problems with knowledge or understanding about the nature of the child or youth's difficulties (in the period rated)	0	1	2	3	4	9
15. Problems with lack of information about services or management of the child or youth's difficulties	0	1	2	3	4	9

CGAS ☐ N/A

- Always refer to the full CGAS glossary in your clinician's reference manual when making the ratings
- On new episode and review, rate the child or youth's most impaired level of general functioning over the preceding 2 weeks
- Only use code 997 if you are unable to rate

Global Assessment Scale: ☐☐☐

Strengths and Difficulties Questionnaire (SDQ) ☐ N/A

- If this measure is required, give the appropriate *Outcomes: SDQ* form to the consumer or parent with the appropriate explanation

If the SDQ is required and is not attached to this form, state the reasons why here: _____